

October 18, 1980

Mr. Howard O. Chinn, P.E. Chief Engineer - Environmental Control Division State of Illinois Attorney General's Office 188 West Randolph Street Chicago, Illinois 60601

Reference:

Evaluation of the Extent of Illinois Ground Water Pollution near the Calumet Container Company, Division of the Steel Container Corporation, Hammond, Indiana

Gentlemen:

We have completed the above noted study. Six (6) copies of our report are submitted with this letter. Our study included a pertinent literature review; a field exploration program, including the installation of observation wells both on the Indiana site and in Illinois, and an evaluation of the chemical test results which were performed by the Illinois EPA.

In brief summary, the test results indicate the potential for ground water migration from the Steel Container Corporation site into Illinois ground waters. Test results of the Illinois ground water indicated that several test parameters exceeded accepted Illinois ground water standards. In addition, non-naturally occurring chemicals, including phenolics, toluene and xylene were found in Illinois ground waters. These organics can be present as a result of operations relating to clean-up of 55 gallon drums, which is the function of the Calumet Container Company. Details of our study, evaluation of test results, and conclusions are contained in the attached report.

We appreciate the opportunity to work with you on this project. A copy will be transmitted to the U.S. Environmental Protection Agency, Region V offices who also contractually supported this study.

Environmental Teeting and Evaluation

If you have any questions concerning this report, or if we can be of further service to you, please do not hesitate to contact us.

Very truly yours,

SOIL TESTING SERVICES, INC.

Mary Ellen Sachs
Project Chemist

Andrew E. Haubert Project Engineer

Kenneth H. Kastman, P.E. Principal Engineer

/j1

Also assisting in technical preparation:

Linn K. Andersen

John Cross

Kathryn R. Huibregtse

cc: U.S. Environmental Protection Agency, Region V 230 South Dearborn Street

Chicago, Illinois 60604

EVALUATION OF THE EXTENT OF ILLINOIS GROUND WATER POLLUTION

near the
Calumet Container Company
Division of Steel Container Corporation
Hammond, Indiana

for

State of Illinois Attorney General's Office 188 West Randolph Street Chicago, Illinois 60601

by

SOIL TESTING SERVICES, INC.

III Pfingsten Road Northbrook, Illinois 60062

STS Job No. 20919

TABLE OF CONTENTS

| I. | Introduction | |
|-----|--|----|
| п. | Background | 1 |
| Ш. | Field Exploration Program | 3 |
| IV. | Discussion and Significance of Results | 10 |
| v. | Conclusions | 19 |
| | References | 36 |
| | Appendix | |

LIST OF FIGURES

- Figure 2 Aerial Photo of SCC Site
- Figure 3 Boring and Well Location Diagram at SCC Site
- Figure 4 Natural Ground Water Flow Pattern
- Figure 5 Surface Mounding Condition Flow Patterns

I. INTRODUCTION

This project was performed by Soil Testing Services (STS) for the State of Illinois Attorney General's Office (IAGO) and the United States Environmental Protection Agency (USEPA) at the Calumet Container Division of the Steel Container Corporation (SCC) in Hammond, Indiana. This work was authorized by Mr. Howard O. Chinn from the Attorney General's office, and was performed under contractual agreements dated February 5, 1980 with the IAGO and March 20, 1980 with the U.S. EPA.

The purpose of the project was to determine whether pollution of the Illinois ground water, surface water and soil has occurred due to SCC operations and to establish the extent of the contamination, if any. Therefore, the major objectives of the study were to:

- 1. Identify the sources of existing contamination located on the SCC property;
- 2. Determine the potential for contaminant migration into Illinois;
- Determine the presence of various contaminants in ground and surface water within Illinois boundaries.

To achieve these objectives, an evaluation of the site area ground water flow direction as well as contamination levels in the water and soil was necessary. The project approach consisted of: 1). A review of the available data and the observation of on-

-2-

going waste disposal processes on site, 2). The location and installation of eleven (ii) ground water monitoring wells, 3). The collection and analysis of three (3) sets of water samples from each well, 4). The collection, analysis, and leach testing of selected sludge and soil samples, and 5). The collection and analyses of various surface water samples. The samples were analyzed by the Illinois Environmental Protection Agency (IEPA) laboratories for a variety of organic and inorganic constituents. The results of the chemical analyses, field observations and ground water elevations in the wells were used to evaluate the extent and source of contamination.

The results of previous studies that have been performed, as well as information obtained concerning operations at the SCC site have been used in establishing our exploration program and subsequent monitoring and testing.

-3-

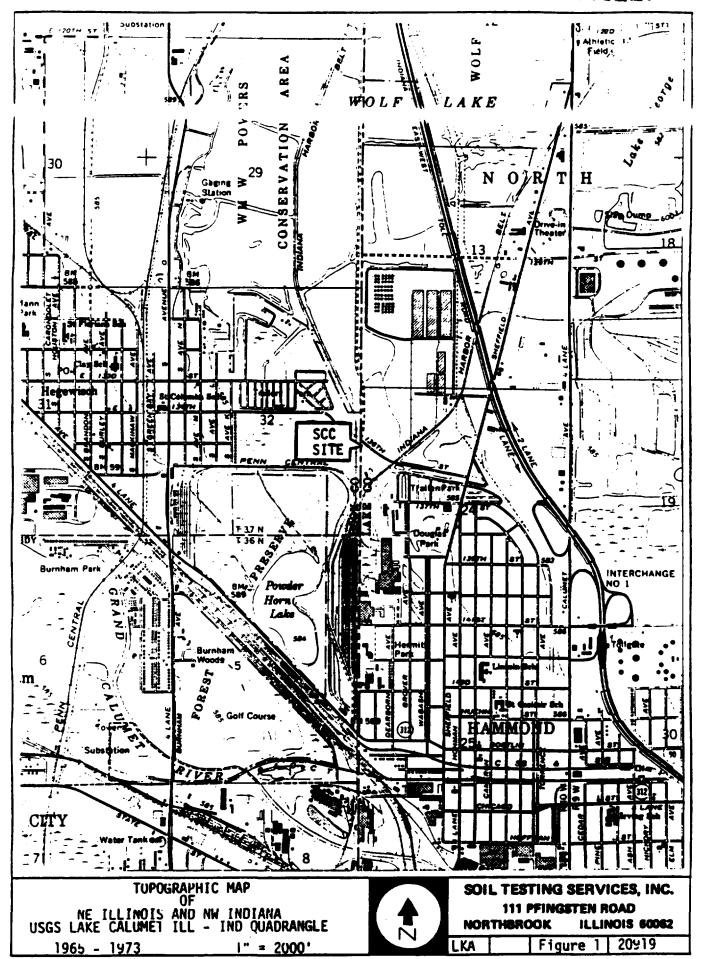
II. BACKGROUND

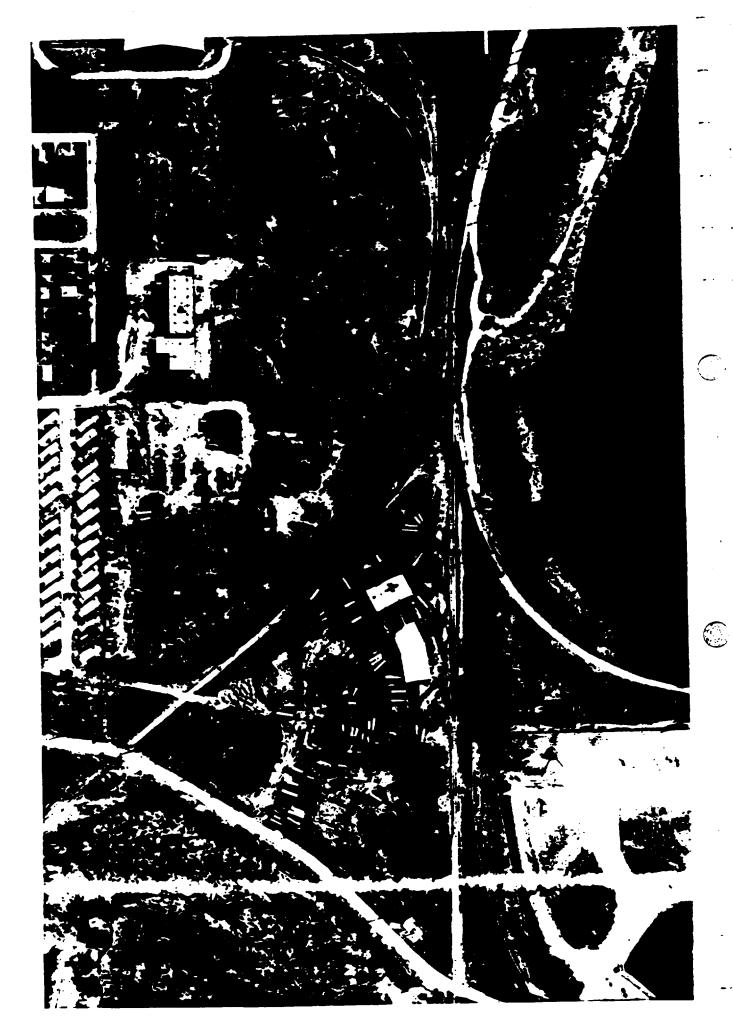
Process Description

SCC operations have included reconditioning of 55 gallon steel drums and 5 gallon pails. Detailed information regarding the specific operating procedures and residual materials in the drums was not available to us. However, residual contents and cleaning agents drained from the drums were visible on and around an outdoor conveyor located on the west side of the reconditioning plant. Also, drums were stored and disposed of at various locations on SCC property. The reconditioning operations have been conducted from the 1960's to the present.

Figure 1 is a United States Geological Survey topographic map of the SCC site and surrounding area. Figure 2 is an air photo of the site taken on April 26, 1978, which shows the building location and various burial and waste barrel storage sites. During a preliminary site visit made by STS personnel on April 7, 1980, drum storage was noted at several locations similar to those seen on the air photo. During the field exploration phase of our study conducted from May 21 to May 23, 1980, drums in these areas were no longer visible, but were detected below grade using a magnetometer. In addition, flattened 55 gallon drums were unearthed at various locations along the railroad tracks where drums had previously been stacked.

Previous investigations at the site by the Illinois State Geological Survey have shown that soil and sludge found at the ground surface adjacent to the site contains high





concentrations of lead, cadmium, toluene and other hazardous materials. Since the contents of the drums being reconditioned varied significantly, and because our only record indicating what the drums might have contained was in a report by John Jagiella from SCC to the State of Indiana, dated December 1978, types and extent of contamination is assumed to be generally unknown.

Geology

The potential for movement of contaminants into Illinois ground water is related to the general geology and hydrology of the site area. Background information relating to area geology and hydrology is presented in the following sections; specific site conditions are described in subsequent sections.

Regionally, the uppermost bedrock unit in northeastern Illinois is comprised primarily of Silurian Age dolomites and limestones. These have been deformed to form the Kankakee structural arch, a major deformation feature in the Great Lakes region. The bedrock is overlain by as much as 400 ft of glacial sediments deposited by the Lake Michigan lobe of the Wisconsinian glacial advance, the last major episode of glaciation in the Midwest.

These glacial sediments were laid down in the form of tills, moraines, and outwash deposits. At least 19 moraine ridges and intervening plains can be delineated in Northeast Illinois and Northwest Indiana (Ref. 4). Fluvial sand and gravel was deposited by outwash streams and rivers and in glacier-related lakes. Once the ice retreated from the area, lacustrine deposits from ancient Lake Chicago, the predecessor of Lake

Michigan, accumulated. In addition, uplands often contain windblown sand and silt while peat accumulations are common in lake basins.

The topography of northeastern Illinois and northwestern Indiana is directly related to glacial history. The moraine and till plains combine to form a gently rolling topography, while the lacustrine plain of Lake Chicago forms a flat gently sloping terrain. The entire area is dissected by several rivers and streams; however, much of the morainal country is without integrated drainageways. The DesPlaines River and the Calumet Sag Channel, located in two relatively large valleys, provide the present drainage to the lake.

The SCC site <u>area</u> is situated on the gently sloping glacial Lake Chicago plain. Changes in the Lake Chicago elevation resulted in the deposition of material in at least three different stages, forming low continuous ridge systems approximately parallel to the present Lake Michigan shoreline. Within this depositional zone, smaller ridges occur as the result of spit, bar and beach deposition. It is these deposits through which the uppermost ground water system flows.

The specific soil conditions at the SCC <u>site</u> are indicated on the boring logs included in the Appendix. In general, the soils are medium grained sands of the most recent depositional stage, the Dolton Member, and contain seams and beds of silt, coarse sand, and gravel. Some of the more prominent sand spit deposits of this unit can be as much as 25 ft thick; however, most are less than 10 ft. The granular soils within the SCC site are approximately 25 ft thick and are underlain by a gray silty clay till, a portion of the Tinley drift deposit. The granular soils are generally in a medium dense state above 10 ft becoming very dense to 25 ft.

A layer of fill was encountered at the surface across the entire site. This material consisted of cinders, sand, gravel and peat and was between 2 and 4 ft thick.

Hydrology

Regionally, the ground water resources in northeastern Illinois and northwestern Indiana are developed in four aquifer systems; 1). the sand and gravel deposits of the glacial soils, 2). Silurian age shallow dolomite bedrock formations, 3). the Cambrian-Ordovician Aquifer in the underlying sandstones, and 4). the Mt. Simon Aquifer in formations of the Cambrian Age. The glacial drift and dolomite formations may be hydrologically connected, but separated in most regions from underlying deposits by the Maquoketa Shale, a relatively impervious formation. Therefore, the upper aquifers are of primary concern with regard to contamination by surface sources. Wells are frequently developed within the near surface aquifer sandy glacial soils for low quantity industrial or residential use.

The SCC area lies to the east of major surface and ground water drainage divides. Therefore, the expected area water flow direction is to the north, or toward Lake Michigan. Originally, the area water flow was thought to be to the west, as based on King's report (Ref. 3). Subsequent to this, further review and actual on-site measurements have established flow to the northeast. United States Geological Survey (USGS) water level readings are available for five lakes in the region; Lake Michigan, Lake Victory, Wolf Lake, Lake George, and Powderhorn Lake. This data confirms that the area ground water direction is to the northeast. There is a 15 ft drop in water level over a distance of approximately 5 miles.

Site hydrology is influenced by the site topography. Surface topography at the SCC site is generally flat, ranging between U.S.G.S. datum elevations of about 585 to 588 ft. The site surface appears to have been raised to its current level by filling; the 1966 flood maps (Ref. 1) indicate that the site is nearly surrounded with water when flooding occurs due to its higher topographic elevation.

There have been numerous observations of ponded water on and around the site in addition to year round lakes or ponds in all directions from the site. Therefore, surface water flow from the site could occur in virtually any direction, depending on the portion of the site on which precipitation may be falling.

The granular soils on site have a relatively high permeability. Therefore, much of the precipitation would migrate downward through the soils to the ground water level rather than flow immediately off site. Once a fluid enters the ground water, the area-wide flow patterns would govern the water flow direction. The ground water table was observed to be approximately 2 to 4 ft below the ground surface at the location represented by the installed observation wells during the defined study period.

-10-

STS Job No. 20919 October 18, 1980

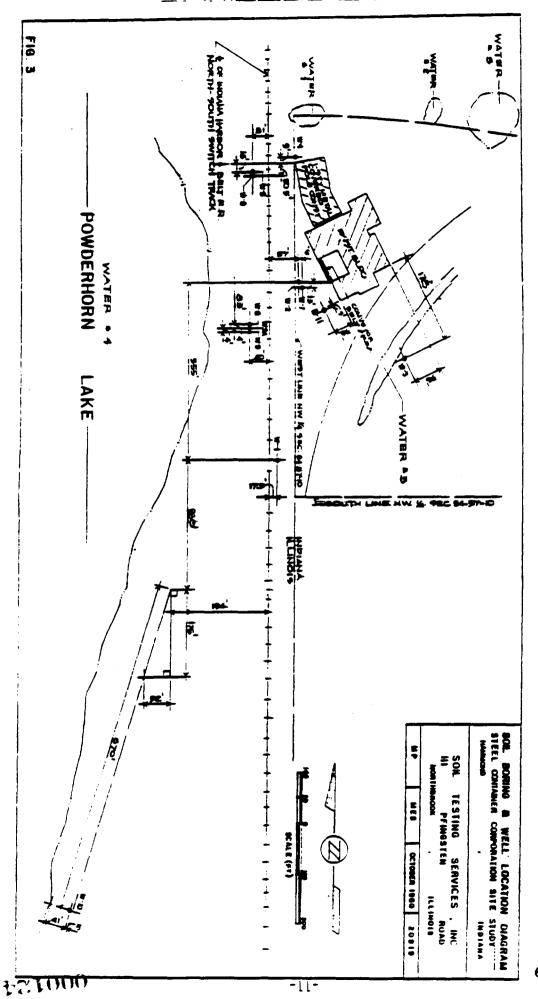
III. FIELD EXPLORATION PROGRAM

Observation Well Installation and Soil Sampling

A field program was outlined in order to evaluate whether Illinois property had been contaminated by operations at the SCC site. Present ground water pollution, if any, was to be determined by installing observation wells and chemically analyzing the ground water samples collected from the wells. Soil samples obtained during the observation well installation, surface sludge samples and surface water samples were also tested to evaluate their contamination levels. A field survey utilizing existing data from the revised Torrenga Engineering Survey (Ref. 7), was performed to determine well locations. The Torrenga survey, revised August 4, 1975, was prepared for Calumet Container Division of The Steel Container Corporation and for the purpose of this report, has been taken to represent an accurate survey of the property.

When used in this report, the term "site" refers to that property of SCC described in the Torrenga Survey; specifically: the Illinois/Indiana border lies 1.81 ft west of the northwest corner of the SCC building. A location diagram of the site, including existing buildings, well locations and various pended areas is shown in Figure 3.

Well locations were chosen using available information on the probable ground water flow paths. As previously noted, J.M. King (Ref. 3) from the Indiana State Geological Survey suggested that the ground water flow was in a west or northwest direction. Also, site hydrological conditions suggest that local surface water flow may be radial from the



site. For these reasons, observation well locations were chosen to define the extent of Illinois ground water pollution by SCC operations as influenced by, 1). a westerly ground water flow, 2). a northern regional gradient, and 3). a radial surface water flow from the site.

The subsurface exploration was performed between May 21 and May 23, 1980. Twelve (12) borings, W-I through W-8, W-9, W-9A, W-10 and B-II were performed. Ground water monitor wells were installed at all borings identified with the "W" prefix. All final boring locations were chosen after the immediate area was scanned with a metal detector to avoid drilling through buried drums. The well tips and standpipes were of polyvinyl chloride (PVC) unless otherwise stated.

Well W-I was placed near the south drum storage area and W-2 was placed at the end of the cleaning conveyor at the processing building. This location was selected to determine contamination contours at one of the known contaminant point sources. Well W-3 was located southeast of the SCC site on Raymond International property to define the radial flow and to aid in constructing ground water flow and contamination concentration contours. Well W-4 was located northwest of the building, another known point source of contamination. This well also aided in flow pattern determinations and concentration profile construction. Wells W-5 and W-9 were drilled into the upper portions of the shallow ground water aquifer (to a depth of 9.5 ft) and were placed near the northern and southern limit, respectively, of the western side of the SCC property. Wells W-6 and W-8 were drilled near W-5 and W-9, respectively, and were extended through the shallow aquifer and into the glacial till. Observation wells were then installed at the base of the granular material above the till.

Wells W-5 and W-6 were located adjacent to each other as were Wells W-8 and W-9, thus forming a well "nest" at these locations. These "nested" wells, installed in both the shallow and deep borings were intended to evaluate potential vertical ground water flow occurring on site and to allow long term monitoring of ground water from two depths at the same location. Well W-9A was adjacent to W-9 and was constructed of stainless steel well screen and riser pipe. This well was installed to evaluate the possible effects of well material types versus organic chemical concentrations in the water. Well W-7 was located next to the conveyor on the SCC property and Boring B-II was drilled next to the SCC building on the southwest side. Well W-10 was located south of the site next to Powderhorn Lake in Illinois, to provide background ground water analyses.

A truck mounted rotary drilling rig was used to perform the soil borings and install the monitoring wells. This process utilized various cutting bits and water, taken from a near-by trailer park hydrant, as a drilling fluid. In all the borings, the bore holes were cased with 4 inch steel casing to maintain an open bore hole during drilling and sampling operations and to minimize the potential for contamination of the underlying soils and ground water. Soil samples were obtained using the split-barrel sampler. The procedure for this method of sampling (ASTM Specification D-1586)is included in the Appendix. All soil samples obtained from the drilling operations were split in half vertically and each portion was sealed in glass jars immediately in the field. One jar was given to the representative from SCC and the other portion was placed on ice and brought to our Northbrook, Illinois laboratory for further examination. All attempts were made to minimize the potential for cross contamination during sample removal from the split-barrel sampler and preparation for transporting.

Wellpoints were installed immediately after sampling. Wellpoints were backfilled to I ft above the slotted well section with pea gravel. A bentonite pellet seal was placed and then backfilling continued with on site material to approximately 2 ft from the ground surface. A second bentonite pellet seal was then placed and a metal protector riser pipe with a lock and key was set around the 2 inch diameter riser pipe. The tops of all wells were capped and covered as close to the ground surface as possible to minimize the possibility of sabotage.

All soil samples were taken to the Soil Testing Services laboratory in Northbrook, Illinois, where samples were classified by an experienced laboratory engineer. This information is listed on the respective boring logs which are in the Appendix.

Soil samples from Wells W-2 and W-7 were delivered to the Illinois EPA laboratory on June 24, 1980 for chemical analyses.

Water Sampling and Chemical Analysis

Within 24 hours after initial well installation, sampling for chemical analysis was performed. As had been defined prior to the study, Illinois EPA personnel would collect all water samples, perform any in-field filtering or preservation of water samples, provide all appropriate containers, and/or bottles, and deliver samples to the Illinois EPA laboratories. The role of STS was to observe operations and make recommendations.

Before each sampling, the wells were bailed by Illinois EPA personnel until approximately five well volumes of water had been removed. Water levels in the well were

-15-

recorded before and after bailing. Upon completion of bailing, samples were pumped into containers cleaned appropriately for the type of chemical tests to be performed. For the initial sampling after well installation, duplicate samples were given to a representative of SCC. Various ponded surface water samples were also taken at this time. Ground water samples and elevations were taken on two subsequent dates, June 3 and 4, 1980 and June 17, 1980, by the Illinois EPA representative, assisted by an STS field geologist. A list of soil and water samples obtained is included in the Appendix as Table 1.

Chemical analyses were performed by the Illinois EPA laboratories. In the STS proposal dated January 23, 1980, recommendations were made regarding chemical constituents which we felt would be indicators of the contamination emanating from the SCC site; however final decisions as to which parameters would be tested were decided by Illinois EPA personnel.

Area Water Level Observations

Due to the relatively permeable sandy soils noted throughout the area, it was considered that surface water elevation differences would provide a good indication of ground water flow directions and paths. On July 17, 1980 and October 8, 1980, selected bodies of surface water were located and their elevations obtained. These surface water features were selected by STS personnel using available aerial photography, (USGS) topographic maps, and subsequent field observations. These were selected to provide representative water data for the SCC study area and are defined, along with the recorded elevations, in the Appendix on Tables 2 and 3.

The elevations, which were field surveyed, were initially referenced to a selected benchmark on the western rail of the Indiana Harbor Belt Railroad line, given an elevation of +100. These elevations were subsequently correlated to the USGS datum, using the USGS elevation of Wolf Lake obtained on the date of the field survey. Daily records of the Wolf Lake water levels are available from the USGS Hydrologic Division in DeKalb, Illinois. The records for the past year are included in the Appendix on Table 4.

-16-

The elevations obtained were used to construct the ground water contour maps, Figure 4 and Figure 5. Similar contour maps occur in the Appendix as Figures 4a and 5a. These maps were constructed using the SACM program, dated March 21, 1977, developed by The Applications Consultants, Inc. (Ref. 2).

NATURAL GROUND WATER FLOW PATTERN

CROUNDWATER ELEVATIONS CONTRINER

SIS Job No. 20919

000131

CONTAIN CAL UME I CROUNDURIER ELLVATION PHASE

11 Thrate Indiana UNINE TIS TETA SEC. 35 2.332 NOET Figure 5

SURFACE MOUNDING CONDITION FLOW PATTERNS

J

.

_

IV. DISCUSSION AND SIGNIFICANCE OF RESULTS

Water Migration Within SCC Study Area

The subsurface conditions and surface water data noted in the immediate SCC area indicate that a strong potential for contaminant movement into Illinois does exist. Movement into Illinois can occur I). as ground water flowing northeast into Wolf Lake, and then west into Illinois, or 2). as surface flow toward Powderhorn Lake due to water mounding from long term disposal operations. This section of the report discusses the potential for water movement, probable paths, and rates.

As previously noted, the geohydrologic conditions at the site are directly related to the subsurface soil conditions, the relative elevations of the surrounding bodies of water, and the sources of infiltration or recharge of the ground water regime. The granular soils occurring in the underlying strata, which comprise the upper aquifer within the study area, have relatively high permeabilities, and thus allow ready movement of the subsurface water. This movement, occurring over a long period of time, attains a steady state flow condition between the various surface water bodies hydraulically connected to the granular strata.

Ground water flow directions and gradients have been observed at the SCC site by obtaining the elevations of 1). nearby bodies of water, including Powderhorn and Wolf Lakes, 2). standing bodies of water within the SCC site itself, and 3). piezometric surfaces within the wellpoint system installed in and around the SCC site. The ground

water was observed to be 2 to 3 ft below the ground surface flowing in the north/northeast direction as indicated by the flow pattern representation in Fig. 4.

Flow from Powderhorn Lake north/northeast across the Illinois/Indiana border into the Wolf Lake area can take place via several flow paths. The shortest route (approximately 1500 ft) would be due north to the southernmost extension of Wolf Lake. However, an extension of Wolf Lake into Indiana projects southward to within 1500 ft of Powderhorn Lake. The difference in elevation of Powderhorn Lake and the Illinois portion of Wolf Lake is approximately 3 ft while the difference between Powderhorn Lake and the channel extension off the Indiana side of Wolf Lake is approximately 2.5 ft. For this reason, due to the differing hydraulic gradients the rate of natural flow directly between the two bodies of water is greater than that to the channel extension.

During our field survey performed on the 8th of October, 1980, the elevation of the south end of the channel was observed to be higher than the water level at Wolf Lake, flow therefore occurring northward toward Wolf Lake. It was noted that the water level of Wolf Lake east of the causeway which approximately separates the Indiana side of Wolf Lake from the Illinois side, was 0.3 ft higher than west of the causeway. Water flow was observed from east to west through a conduit extending under the causeway. This flow completes the path for water flow from Powderhorn Lake, beneath the SCC site, to the channel extension and into Wolf Lake proper.

Based on the available field information and laboratory grain size information, the soils occurring in the upper 25 ft were determined to have an average permeability

of 5.0 x 10⁻³ cm/sec. Grain size analysis data is included in the Appendix. Although variations in both the grain size distribution and the nature of the soils occur within the strata, this value can be considered an average representation of the soil permeability. The flow of water through a unit volume of this soil can therefore conceivably occur at a rate of 30 ft/day. At this rate, the flow of water from Powderhorn to Wolf Lake could occur in as short as 51 days, however, this would require ideal seepage conditions within the soil.

Since low gradient conditions are present, this rate, in reality, would be much lower. Utilizing the regional gradient between Powderhorn and Wolf Lakes a flow rate of 0.12 to 0.16 ft per day is obtained, water flowing north/northeast from Powderhorn Lake would enter the Wolf Lake system in 20 to 30 years. It is conceivable that foreign material entering the ground water system at the SCC site could reach Illinois surface water at Wolf Lake within 25 years, provided the regional gradient governs the flow of the ground water.

In general, the infiltration of <u>surface water</u> to the underlying soils and subsequently into the ground water regime would tend to flow downward vertically to the ground water table and then in the direction of the regional ground water flow. Since most water entering any ground water system results from precipitation, recharge into the ground water regime is, for the most part, uniform for a given area. In this case, the movement of water through the unsaturated zone would be primarily vertical.

If a local source is introduced into the system, such as a point or area recharge source, it would tend to saturate the soil above the piezometric surface, in effect, raising the

ground water level at that point, thus creating a recharge mound. Natural recharge mounds develop where a surface body of water, such as a lake or pond, occurs above the ground water level, feeding the ground water system. Artificial mounds can also be created by ponding at the surface or continuous wetting of the ground surface. Persistent discharge of fluids and other foreign matter could potentially enter the unsaturated zone and flow downward toward the natural ground water table. Large amounts of discharge may eventually saturate the soils, raising the ground water table artificially, causing a mounding situation. When this occurs the ground water may be raised to the ground surface at these points and radial flow would occur in all directions away from these points to that point where the artificially created ground water level merges with the natural ground water level. Here the radial flow would change directions to flow with the regional ground water gradient. Large discharge over an area may act to enlarge the point sources, creating an area source of recharge with perimeter radial flow.

At the SCC site there are likely several points or area sources, these include a discharge area at the end of the conveyor belt to the southwest of the Calumet Container structures, the barrel stockpiles south of the buildings, and the drain pipe discharge along the northern wall of the main building.

During visits to the site during the past several years it has been noted that surface liquids were flowing from the SCC site on the ground surface. In certain low portions, such as the ditches occurring along the railroad tracks immediately west of the SCC site, collection basins for surface runoff have developed, creating additional recharge zones.

In the past, liquids were observed to flow from the SCC site across the railroad tracks into Illinois (Ref. 5). This would indicate that ground water recharge sources and mounded areas may extend beyond the SCC property itself and actually into Illinois property.

The mounding effect at the SCC site has been modeled using surface water elevations and an estimated mound elevation near known points of discharge. The resulting contour map is presented in Figure 5, and perspective drawings of this condition are included in the Appendix as Figures 6 and 7. As can be seen, flow from the SCC site under this condition is radial, toward Powderhorn Lake, Wolf Lake and other bodies of surface water surrounding the site. Using permeability values calculated as discussed previously, and gradients estimated from the model, it has been determined that water would flow from the point sources at a rate of 0.49 ft per day toward Powderhorn Lake and could ultimately reach the lake in 1.5 years or Wolf Lake in 9.0 years with a flow rate of 0.31 ft/day, once a mounding condition is established. Ground water flow into Illinois under mounding conditions therefore could be either directly to Powderhorn Lake or to Wolf Lake extensions in Indiana and subsequently to the main body of Wolf Lake.

If at the recharge source, foreign material or other matter was present in the discharge liquid, the permeability or percolation rate through the unsaturated zone may be reduced by plugging or clogging of the soil pore spaces. Reducing the permeabilities of the surficial soils will, in effect, cause increased surface runoff, enlarging the point source or recharge area. This situation may also occur in areas where densification of the upper soils takes place, also reducing the permeability of the soils. This densification may be due to vehicular traffic or other means including deliberate controlled densification.

Contamination Criteria

The results of chemical tests were received from the Illinois EPA as testing was performed. Tables 5 through 7 in the Appendix were developed in summary form from the Illinois EPA data. These tables contain all test results. All results indicated on these tables are reported in either milligrams per liter (mg/l) for water samples or in micrograms per gram $(\mu g/g)$ for soil samples. For uniformity within the text of this report, the term parts per million (ppm) will be used when describing units and specific constituents. The following is a correlation between the various units used within the report:

Water: 1 milligram per liter (mg/l) = 1 part per million (ppm)

l microgram per liter (_g/l) = l part per billion (ppb)

1 part per million (ppm) = 1,000 parts per billion (ppb)

Soil: I milligram per kilogram (mg/kg) = 1 part per million (ppm)

I microgram per gram (g/g) = I part per million (ppm)

1 microgram per kilogram /eg/kg) = 1 part per billion (ppb)

In order to evaluate the results of the chemical tests, it was necessary to establish a set of criteria indicating limits for the various constituents being reviewed. Appropriate state and federal guidelines were consulted. In general, strict guidelines have been established only for water analyses and few guidelines, if any, have been established for either sludge or soils. With regard to the water testing, the appropriate criteria for this

000135

Contamination Criteria

The results of chemical tests were received from the Illinois EPA as testing was performed. Tables 5 through 7 in the Appendix were developed in summary form from the Illinois EPA data. These tables contain all test results. All results indicated on these tables are reported in either milligrams per liter (mg/l) for water samples or in micrograms per gram (mg/g) for soil samples. For uniformity within the text of this report, the term parts per million (ppm) will be used when describing units and specific constituents. The following is a correlation between the various units used within the report:

Water:

1 milligram per liter (mg/l) = 1 part per million (ppm)

l microgram per liter (\(\sigma l \) = l part per billion (ppb)

I part per million (ppm) = 1,000 parts per billion (ppb)

Soil:

1 milligram per kilogram (mg/kg) = 1 part per million (ppm)

I microgram per gram (g/g) = 1 part per million (ppm)

1 microgram per kilogram (kg/kg) = 1 part per billion (ppb)

In order to evaluate the results of the chemical tests, it was necessary to establish a set of criteria indicating limits for the various constituents being reviewed. Appropriate state and federal guidelines were consulted. In general, strict guidelines have been established only for water analyses and few guidelines, if any, have been established for either sludge or soils. With regard to the water testing, the appropriate criteria for this

project are the Illinois Pollution Control Board Rules and Regulations, Vol. 2, Chapter 3, 1979. These regulations define various rules used for ground water, surface water and fot effluent from water treatment facilities. The two appropriate guidelines for this project are for ground water and surface water. In the context of this report ground water is termed all of the samples which were obtained from observation wells or from below grade. Surface water is any ponded body of water existing at the ground surface at the site. The Illinois EPA has summarized the test guidelines, and they are included in the Appendix as Table 8.

The water test guidelines just noted only govern general test parameters, inorganic chemical constituents, and heavy metal constituents. They do not provide guidelines for most organics, since organics are not naturally occurring chemicals. Therefore, in the context of this report, the organic constituents we have examined, including benzene, toluene, xylene, PCB's and phenolics will be considered as contaminants if they occur in the surface water or ground waters tested, since they are not naturally occurring in any soil or ground water system, and therefore their presence will indicate a higher than natural background level.

With regard to soil and sludge contamination levels, the presence of high amounts of chemical constituents can be taken as an indicator of the potential for continued long term contamination of ground water. That is, if they exist within the soil system, they may potentially be leached by precipitation or continued ground water flow until at some point in the future they are totally dissipated in the environment. Many of the chemicals which were tested are water soluble and could migrate quite rapidly. Others are virtually insoluble in water and would take many years to totally dissipate.

000150

In our study we were particularly concerned with the integrity of Illinois ground and surface water. The extent and nature of the contaminants found in Illinois ground water varied with sampling date and location. From what is known of operations at the SCC facility and from analyses of samples taken at points on the property, it has been determined that the site possesses the potential of contaminating Illinois property. The following paragraphs discuss the general results of the testing program. The major types of chemical constituents are discussed separately and include:

- 1). Organics
- 2). Inorganics
- 3). Heavy metals
- 4). General chemical parameters.

Significant test results for each of these major areas are briefly discussed along with the general ramifications of their existence within the ground water. A summary of both on-site and off-site contamination is then presented. For clarity, the following table indicates well locations:

Observation wells in Indiana:

W-2, W-3, W-4, W-7.

Observation wells in Illinois:

W-1. W-5, W-6, W-8, W-9, W-9A, W-10.

000141

Organic Parameters

Samples were tested for five different organic parameters. A brief description of these parameters and a discussion of the occurrence in the various samples obtained from onsite and off-site locations is provided below.

Xylene and Toluene

These materials are used as solvents in the paint industry and are present in the sludge from the SCC operations. They are both volatile having boiling points from 10 to 139°C and are quite toxic with threshold limit values (TLV) of 100 ppm and 200 ppm. Specific water level limits have not been established. Concentrations of these aromatics were extremely high in sludge samples collected on site, where 2.7% was measured. Surface fluid samples generally contained low or non-detected amounts possibly due to the volatility of these solvents. Groundwater samples from on-site Wells W-2, W-4 and W-7 all contained measurable amounts of the aromatics. Highest concentrations were found in Well W-7 with xylene amounts from 5.4 - 28 ppb and toluene from 0.85 - 20.9 ppb.

Lower concentrations of the aromatics were measured in the ground water sampled in Illinois. Wells W-8, W-9 and W-9A contained variable amounts ranging from approximately 0.1 - 0.9 ppb. Both aromatics were also detected in Well W-L. Since neither compound is naturally occurring and because of the presence of high concentrations of these materials on the SCC property, it is our opinion that the materials found in the Illinois wells originated from Indiana's Calumet Container

000142

Organic Parameters

Samples were tested for five different organic parameters. A brief description of these parameters and a discussion of the occurrence in the various samples obtained from onsite and off-site locations is provided below.

Xylene and Toluene

These materials are used as solvents in the paint industry and are present in the sludge from the SCC operations. They are both volatile having boiling points from 10 to 139°C and are quite toxic with threshold limit values (TLV) of 100 ppm and 200 ppm. Specific water level limits have not been established. Concentrations of these aromatics were extremely high in sludge samples collected on site, where 2.7% was measured. Surface fluid samples generally contained low or non-detected amounts possibly due to the volatility of these solvents. Groundwater samples from on-site Wells W-2, W-4 and W-7 all contained measurable amounts of the aromatics. Highest concentrations were found in Well W-7 with xylene amounts from 5.4 - 28 ppm and toluene from 0.85 - 20.9 ppm.

Lower concentrations of the aromatics were measured in the ground water sampled in Illinois. Wells W-8, W-9 and W-9A contained variable amounts ranging from approximately 0.1 - 0.9 ppm. Both aromatics were also detected in Well W-1. Since neither compound is naturally occurring and because of the presence of high concentrations of these materials on the SCC property, it is our opinion that the materials found in the Illinois wells originated from Indiana's Calumet Container

Corporation. Several point sources may contribute to the contamination including the conveyor system, surface sludges and possibly the burial ground near Well W-1. Although measured amounts are small in the groundwater, contamination of any local groundwater is serious because of the difficulty in containing and treating the fluids.

PCB's

Polychlorinated biphenyls or PCB's are chlorinated organic chemicals with wide industrial application. Extremely stable and nonflammable, they are impervious to degradation by boiling, acid or alkali and are able to withstand high temperatures. Liquid PCB's have been used as dielectrics, in hydraulic fluids, cutting oils and grinding fluids and as sealants and plasticizers.

PCB's are soluble in fats and tend to accumulate in the fatty tissues of higher organisms in the food chain. Not much is known about the toxicity of PCB's to humans, but reports have been published of poisonings from consumption of rice oil contaminated by the chemicals. Levels on the SCC site and surrounding areas were found to range from 0.1 ppb to 1.0 ppb.

Phenolics

Phenolic materials are waste products of various chemical producing companies and can be present in various resins which were in drums to be reclaimed.

000144

Corporation. Several point sources may contribute to the contamination including the conveyor system, surface sludges and possibly the burial ground near Well W-1. Although measured amounts are small in the groundwater, contamination of any local groundwater is serious because of the difficulty in containing and treating the fluids.

PCB's

Polychlorinated biphenyls or PCB's are chlorinated organic chemicals with wide industrial application. Extremely stable and nonflammable, they are impervious to degradation by boiling, acid or alkali and are able to withstand high temperatures. Liquid PCB's have been used as dielectrics, in hydraulic fluids, cutting oils and grinding fluids and as sealants and plasticizers.

PCB's are soluble in fats and tend to accumulate in the fatty tissues of higher organisms in the food chain. Not much is known about the toxicity of PCB's to humans, but reports have been published of poisonings from consumption of rice oil contaminated by the chemicals. Levels on the SCC site and surrounding areas were found to range from 0.1 ppm to 1.0 ppm.

Phenolics

Phenolic materials are waste products of various chemical producing companies and can be present in various resins which were in drums to be reclaimed.

STS Job No. 20919 October 18, 1980

-29-

Concentrations from 10 to 100 ppb can be detected by taste and trace amounts of one ppb can be tasted after chlorination (Ref. 6). The Illinois EPA has set a limit of 0.001 ppm or 1 ppb for phenolics in groundwater and 0.1 ppm for surface waters.

Surface fluid samples from SCC property exceeded this level as did all groundwater samples collected. The only samples not exceeding the limit were samples obtained from marsh and lake sources in Illinois. Surface water samples contained from 0.1 to 14 ppm of phenolics so these impoundments can be considered potential point sources of contamination.

Phenolic concentration in ground water samples from Wells W-2, W-4 and W-7 varied considerably. Well W-7 contained 14 to 18 ppm, greater than 10,000 times the allowable limit. Wells W-4 and W-2 were less affected containing amounts from .013 - 0.18 ppm or 10 to 100 times established limits. Illinois groundwater samples generally ranged from 0.006 to 0.126 ppm, 6 to 126 times the allowable limit. All but two samples tested exceeded the limit of 0.001 ppm.

The high concentrations of phenolics measured on the SCC property (especially Well W-7), indicate the likely source of contamination in Illinois. Since phenolics are quite soluble in water and are therefore quite mobile, their movement in the area is not unexpected.

SOIL TESTING SERVICES

Benzene

Benzene is an aromatic hydrocarbon which is the basic six carbon ring from which many other organic compounds are evolved. In pure form, benzene is a colorless liquid with a boiling point of 80.1° C. Benzene is used in the formulation of numerous substances, including paints and coatings, dyes, phenols, organic chemicals, styrene and pesticides.

Benzene was not detected in any of the ground water surface water or soil samples, although it may have undergone chemical degradation or recombination or may have been volatilized.

Inorganic Parameters

Inorganic non-metal parameters include measurements for constituents such as alkalinity and ammonia, as well as chloride, nitrogen and phosphorus. Total of eighteen parameters were tested in this category and are included on tables in the Appendix. A discussion of parameters and their occurrence in particular samples follows:

Ammonia - Nitrogen

Ammonia-Nitrogen levels exceeded the limit of 1.5 ppm for surface or ground waters in almost all samples taken on the SCC site and surrounding areas. In particular, Wells W-3, W-4 and W-6 had levels ranging from 8.6 ppm to 24 ppm, and

Well W-7 contained up to 43 ppm nearly 30 times the allowable level. Ammonia is generally present in all types of wastewater and is an indication of domestic pollution. Ammonia can be produced by the reduction of nitrate, by the deamination of compounds containing organic nitrogen, and by the hydrolysis of urea.

Phosphorus

Phosphorus occurs almost solely in the form of phosphate. Large quantities of total phosphate, greater than the 0.05 ppm limit, were found in Wells W-2, W-3, W-4, W-6, and W-7. Although presence of this material cannot be traced directly to operations at SCC, its higher occurrence at the site of Wells W-4 and W-7 may be due in part to cleaning preparations which are commonly used in rinsing operations and for this reason may have been a point source for this material, noted in high concentrations in some of the Illinois ground water samples.

Cyanide

A level of 0.025 ppm has been established as the limit for cyanide in ground and surface water. Cyanide is extremely toxic and is found predominantly in industrial wastes. Cyanide is not naturally occurring in natural waters, and therefore its presence indicates contamination.

Levels of 0.02 ppm to 0.04 ppm were found in Wells W-4, W-6 and W-10. Well W-7 contained levels of 0.17 ppm to 0.24 ppm, almost 10 times the allowable level. The level in Well W-5 may be related to the high level noted in Well W-4. The reason for the high level in Well W-10 is unclear.

Boron

Levels of greater than I ppm, the Illinois limit, of boron were detected in Wells W-I, W-2, W-3, W-4, W-6, W-7, W-8 and W-9A. Although boron can be found in trace amounts in natural waters, higher levels can result from residues from cleaning agents and industrial wastes. The highest levels were found at the suspected point sources, Wells W-7 and W-4. Low doses of boron have been seen to affect the human nervous system.

Heavy Metals

A total of fourteen heavy metals were tested for in this study. Levels exceeding established limits are discussed in the following paragraphs.

Iron

Total iron was analyzed for this study. A level of 1.0 ppm is the limit for ground and surface waters. Wells W-I through W-9A contained levels higher than this limit. Only Well W-10 was below the limit. Iron can enter a water system by

various means including leaching of natural deposits, from iron-bearing industrial wastes and from pickling operations. Waters containing more than 0.3 ppm total iron would cause staining and produce a bitter taste if used in a domestic water supply system. However, due to the presence of the steel industry in the Calumet region, it would be inappropriate to establish the direct source of the high iron levels based on the current data.

Manganese

Wells W-I through W-9A also contained levels of manganese concentrations exceeding the limit of 0.15 ppm. Wells W-I, W-3, W-8 and W-9 had levels ranging from 1.00 ppm to 4.93 ppm. Levels of 0.1 ppm can cause taste and staining problems if introduced into a potable water system. Again, manganese can be directly related to the steel industry.

General Parameters

For this study, pH, conductivity or specific conductance, biological oxygen demand (BOD), fecal coliform, chemical oxygen demand (COD), and oil and grease are considered general indicator parameters. All samples contained higher levels for most of those parameters which had established limits, and this would indicate the presence of contamination.

Summary of On-Site Contamination

High concentrations of various constituents including xylene, toluene, phenolics and ammonia were found in soil, sludge, surface fluid and groundwater samples collected on SCC property. The highest concentrations of solvents and PCB's were found in sludge samples on the ground surface. Soil samples collected at one location indicated that these materials had not migrated to lower soil depths. However, groundwater had become affected. Surface fluids contained various constituents, most notably phenolics, ammonia, boron, fluoride, oil and grease (hexane extractables) and some metals. These impoundments could also be sources of subsurface contamination.

Groundwater results indicate a major source of contamination in the conveyor area near Wells W-2 and W-7 and a secondary source near Well W-4. This is due to the observed presence of nearly all organics, heavy metals, and inorganics at these locations. The shallow well, W-7, showed significantly higher concentrations of most constituents likely due to the proximity to the contamination source.

Summary of Off-Site Contamination

Water samples taken from beyond the boundaries of the SCC site were limited to ground water samples, and a water sample taken from Powderhorn Lake.

Well W-I contained contaminant levels exceeding limits for sulfate, iron, and boron. Both xylene and toluene were also detected in the ground water.

Well W-5, a shallow well, indicated higher levels of phosphorus, iron, manganese and phenolics. Well W-6, installed in a nested condition with Well W-5 had a pH range of 8.8-9.0, and levels of phenolics, phosphorus, ammonia, and cyanide exceeding accepted standard levels. There is a correlation between the presence of some constituents in Well W-6 and Well W-4 which is on SCC property. It is very likely that the point source at the Well W-4 location is contributing to levels in Well W-6.

Higher than acceptable levels for phenolics, ammonia, boron, phosphorus, iron and manganese were found in Wells W-8, W-9 and W-9A which may correspond to elevated levels on SCC property. Also the presence of toluene, xylene and PCB's in the ground waters at these locations indicate contamination. Due to the higher levels of the same organic constituents on the SCC site, it is concluded that the SCC site is a point source for these materials.

The one sample from Powderhorn Lake that was analyzed did not indicate substantial levels of any constituents. However, no conclusions have been drawn from this data since it is felt that a single sample would not provide sufficient information for a conclusive evaluation.

V. CONCLUSIONS

Our literature review, subsurface exploration and the test results from the observation wells which were installed have allowed us to reach conclusions with regard to the potential for contamination of Illinois ground waters due to the operations at the SCC site. They are as follows:

- I. Although the general ground water flow under the SCC site is in a northeasterly direction, ground water from the SCC site can reach Illinois by either of two paths: I). by flowing northeasterly into the Indiana arm of Wolf Lake and then westerly back into Illinois or 2). when continuous operations exist at the SCC site, mounded surface water can flow directly into Illinois and migrate into the ground water table associated with Powderhorn Lake.
- 2. There are at least two known point sources of contamination on the SCC property. They include the dumping area at the end of the drum cleaning conveyor and the rinsing area at the northwest corner of the processing building. Several boring and observation well chemical tests indicate high degrees of contamination at both of these locations. It is likely that there are also additional unknown sources of contamination which include buried drums and various smaller areas of ponded sludge materials and solvents.

- 3. Test results of wells placed in Illinois indicate the presence of contamination in Illinois ground water. These contaminants include elevated levels of phenolics, toluene and xylene, which are not naturally occurring in any ground water and can be directly correlated to the cleaning operations at SCC. Ammonium levels exceeding Illinois Standards were found in Illinois waters and can be correlated to operations at SCC. Also, some elevated concentrations of heavy metals and other inorganic constituents have been found in Illinois waters.
- 4. Concentrations of organics, inorganics, and heavy metals found in observation wells in Indiana, exceeded the general guidelines. Also, samples of the soil and sludge in Indiana, on-site, indicated extremely high levels of chemical contaminants. In our opinion, they would continue to be a source of potential contamination into the ground water and therefore, potentially into Illinois ground water, for years to come.
- 5. In our opinion, the existing contaminants pose a threat to both Illinois and Indiana ground waters and we feel that remedial action should be taken to mitigate the existing and potential contamination of these ground waters.

REFERENCES

- 1. Allen, Howard E., "Floods in Lake Calumet Quadrangle", Northeastern Ill
- 2. Applications Consultants, Inc., "Surface Approximations and Contour with Faulting Users Guide", March 21, 1977
- 3. King, James M., Geologic Report for Calumet Container Compan At (Lake County) Indiana, December 7, 1978
- 4. Peck, Ralph B. and Reed, William C., "Engineering Properties of Chicago S Volume 51, Number 44, February, 1954
- 5. Stallsmith, Joe, Inspection Report Calumet Container, Hammond, Indiana, 20, 1979
- 6. "Standard Method for the Examination of Water and Waterwater", 14th E 1975
- 7. Torrenga Engineering Calumet Container Division of Steel Container Coroc Site Survey, revised August 4, 1975

```
Standard Method: D 1586-67 - Penetration Test and Split-Barrel Sampling of Solls
                                                                              Surface Water Elevations Taken at S.C.C. and Surrounding Areas
                                                                 Ground Water Elevations for Wells Installed at S.C.C. Site
                                                                                            U.S. Department of the Interior - Geological Survey Primary Computation of Gage Height - Wolf Lake at Chicago, Illinois
                                                                                                                                                                                                      Ground Water Perspective - Mounded Condition - Facing South
                                                                                                                                                                                                                    Ground Water Perspective - Mounded Condition - Facing East
                                                                                                                                                               Criteria Used in Determining Levels of Contamination
                                                                                                                                                  Results of Analyses on Surface Water Samples
                                                                                                                 Results of Analyses on Ground Water
                                                                                                                                                                                          Surface Mounding Condition Flow Pattern
                                                                                                                                                                             Natural Ground Water Flow Pattern
                            Laboratory Testing - Grain Size Analysis
                                                                                                                                     Results of Analyses on Soil
                                                      Sample List
                Boring Logs
                                           Table 1
                                                        Table 2
                                                                     Table 3
                                                                                  Table 4
                                                                                                      Table 5
                                                                                                                          Table 6
                                                                                                                                        Table 7
                                                                                                                                                                   Figure 4a _
                                                                                                                                                     Table 8
                                                                                                                                                                                 Figure Sa.
                                                                                                                                                                                             Figure 6 -
~;
                                                                                                                                                                                                           Figure 7
             N
                                       4.
                                                                   ø,
                                                                              ٧.
                                                                                                    ∾ં
                                                                                                                        ο,
                                                                                                                                     6
                                                                                                                                                   Ξ.
                                                                                                                                                                              Ü,
                                                                                                                                                                                         14.
                                                                                                                                                                                                       2.
```

.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St., Philadelphia, Pa. 19103

Reprinted from Copyrighted 1968 Book of ASTM Standards, Part 11

000156

Standard Method for

PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS'



ASTM Designation: D 1586 - 67

This Standard of the American Society for Testing and Materials is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain representative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 Drilling Equipment—Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid "whips" under the blows of the hammer, it is recommended that the drill rod have a stiffness equal to or greater than the A-rod. An "A" rod is a hollow drill rod or "steel" having an outside diameter of 11 in. or 41.2 mm and an inside diameter of 11 in or 28.5 mm, through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15 m). The hole shall be limited in diameter to between 2½ and 6 in. (57.2 and 152 mm).²

2.2 Split-Barrel Sampler—The sampler shall be constructed with the dimensions indicated in Fig. 1. The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four ½-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 Drive Weight Assembly—The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 Accessory Equipment — Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

3. Procedure

3.1 Clear out the hole to sampling elevation using equipment that will ensure that the material to be sampled is not disturbed by the operation. In saturated sands and silts withdraw the drill bit slowly to prevent loosening of the soil around the hole. Maintain the water

level in the hole at or above ground water level.

- 3.2 In no case shall a bottom-discharge bit be permitted. (Side-discharge bits are permissible.) The process of jetting through an open-tube sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below sampling elevation. Record any loss of circulation or excess pressure in drilling fluid during advancing of holes.
- 3.3 With the sampler resting on the bottom of the hole, drive the sampler with blows from the 140-lb (63.5-kg) hammer falling 30 in. (0.76 m) until either 18 in. (0.45 m) have been penetrated or 100 blows have been applied.
- 3.4 Repeat this operation at intervals not longer than 5 ft (1.5 m) in homogeneous strata and at every change of strata.
- 3.5 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fractions thereof. The first 6 in. (0.15 m) is considered to be a seating drive. The number of blows required for the second and third 6 in. (0.15 m) of penetration added is termed the penetration resistance, V. If the sampler is driven less than 18 in. (0.45 m), the penetration resistance is that for the last 1 ft (0.30 m) of penetrated (if less than 1 ft (0.30 m) is penetrated, the logs shall state the number of blows and the fraction of 1 ft (0.30 m) penetrated).
- 3.6 Bring the sampler to the surface and open. Describe carefully typical

Currens edition accepted Oct. 20, 1967. Originally issued 1958, Replaces D 1586 - 64 T.

¹ Under the standardisation procedure of the Society, this method is under the jurisdiction of the ASTM Committee D-18 on Soil and Rockfor Engineering Purposes. A list of members may be found in the ASTM Year Book.

² Hyorniev, M. J., Surface Exploration and Sampling of Soile for Civil Engineering Purposes, The Engineering Foundation, 345 East 47th St., New York, N. Y. 10017.

| OWNE | | | | | Corporation | | LOG OF BORING NUMBER | | | | | | | |
|--------------------|-------------------|------------|--------------|-------------|--|--------------------|----------------------|---|--|---|--|---------------------|----------|--|
| PROJE | | _ | | r | corporation | W-1 ELIENT | | | | 11.5 | .E.P., | Δ | | |
| | | | | on | tamination Evaluation | Illino | is At | torne | y Ger | | | | | |
| SITE L | | | | <u> </u> | | | | O- " | | 460 COM | | E STREM | TH | |
| Натто | ond, | Inc | lia | na | | | | | - | | 3 | 4 | 5 | |
| ELEVATION Depth | LE NO. | AMPLE TYPE | PLE DISTANCE | OVERY | description of Mat | ERIAL | DRY WT. | UM > | #TIC 17 % | #A CONT | TER ENT % | LIGH LIMI 0 1 | T % | |
| E E | SAMPLE | BAME | SAMP | RECC | SURFACE ELEVATION +100 | | LE C | STANDARD PENETRATION BLOWS/FT 10 20 30 40 5 | | | | | | |
| | 1 | SS | | | Fill, cinders, little pea | t-medium- | | | 及 | | | | | |
| === | | PΑ | \boxminus | | Saturated-(FIII) | o mearum - | | | | - | | | | |
| | 2 - 2 <u>0</u> | SS | \coprod | Щ | Strong odor - sludge | - | <u> </u> | 葱 | _ | 1 | <u> </u> | | | |
| | | PA SS | \dashv | H | Fine sand, little gravel | | | | | 196 | | \vdash | | |
| 5.11 | 3 -3A | | Щ | Щ | trace medium to coarse \saturated-(SP-SM)Modera | | | | 1 | 36" | | | | |
| === | | QR | \forall | Н | Fine sand, trace medium | | - | | | - N | | | | |
| | 4 | SS RR | | Ц | light brown-medium-satu | | | | | Ī | | | | |
| | 5 | SS | | | Moderate odor | · · · | | | | * | | | | |
| | | - | ╣ | - | Fine sand, trace gravel | k medium to | | | İ | | | | | |
| | | | ı | | coarse sand-light brown | | | | | ! | | | | |
| | | | | | saturated-(SP) | | | | | | | | | |
| | | RB | İ | | Moderate odor | ! | | | | | |] | | |
| 15.0 | | | | | | | | | | | | | | |
| | | | П | П | | | | | | * | | | | |
| | 5 | SS | -14 | ᅫ | | | | | | |] | | | |
| | | RВ | \sqcup | | · · · · · · · · · · · · · · · · · · · | | | | | <u> </u> | <u> </u> | | | |
| ==== | | | | | Very fine sand, little s brown-medium-saturated- | | | | | | | | | |
| 20 | _ | 88 | ┪ | + | Slight odor | (=, =,, | | | | |] | | | |
| | 7 | SS | Ц | \dashv | | | | | | X |] | | | |
| | | | | | | | | | | / | | | | |
| | | RB | | | Silty clay, trace gravel | cand & | | | | / | | ├ | | |
| 25. U | | RB | ᆛ | | shale-gray-wet-(CL) | , sanu a | | | | V | | | | |
| | 8 | SS | | Ц | Lower end Sample 8-less | consolidate | | | X | | | | | |
| - 26.5 | | | | | | | | | | | | | | |
| | | | | | END OF BORING | | | | ł | | | | | |
| | | | | | "A" - Silty fill,fine | and, little | inde | rs-da | rk br | own-π | ediur | - | | |
| | | | | | moist to wet-(Fi | il) Partly of | gani | ; | i | ł | 1 |] | | |
| | | | | | "B" - Silty fine sand, | | | | park | gray- | medi | s m- | | |
| | | | | | CASING: 25 of 4 Set | 2" DVC well | 3 25 | <u> </u> | | <u> </u> | <u> </u> | | | |
| | M# 871 | BATIF | EATI | 64 (| INES REPRESENT THE APPROXIMATE SQUIP | T LINES BETWEEN SC | | | | | | - | | |
| , | | | _ | | | 1 | E/ | 31L T: | ESTIN | G SEI | RVICE | S. THE | · . | |
| WL | 3' | | | | WS OR WD BORING STARTED | | 50 | | | G SEI IGSTEN | | S. THE | . | |
| | | BC | R | | ACR BORING COMPLET | | NO | PTHE | II PFIN | IGSTEN | ROAD | S 6006 | 2 | |

Ē

| APPE BY LKA75 STS JOB NO. 20919 | MIG Rotary FOREMAN SterlingAPPTD BY | WL |
|--|---|---|
| NORTHEROOK ILLINOIS 60062 | BORING COMPLETED 5/23/80 | WL BCR ACR |
| SOIL TRUING SERVICES. INC. | BORING STARTED 5/23/80 | WL 4" WS OR WD |
| | THE APPRECIATE SOURCE LINES SETWEEN SOIL | THE STRATIFICATION LINES REPRESEN |
| | BORING 10' 4" PVC well @ 8' | Moderate END OF 80 CASING: Set 2" F |
|) NE | saturated-(SM) Strong chemical odor Fine sand, trace gravel & Silt- brownish gray-dense-saturated-(SP) | |
| M 15 | roots-dark gray-medium-moist-(Fill) (Strong chemical odor Fine sand, trace sitt-light brown to gray-medium-saturated-(SP) Strong chemical odor Silty fine sand-gray-medium- | 2 SS Trong chem 2 SS Trans-medium 5:0 3 SS Strong chem |
| UNIT DRY WATER LIGHT WATER LIG | | ELEVATION DEPTH SAMPLE NO. SAMPLE TYPE SAMPLE DISTANCE RECOVERY |
| O- UNCOMPRESSIVE STRENGTH TONS/FT 1 3 4 5 | | SITE LOCATION Hammond, Indiana |
| Attorney General's Office | ion Evaluation CLIENT Illinois | Ground Water Contamination |
| ENG NCMBAX | | Steel Container Corporation |
| | | |

| OWNER | - | ont: | air |)er | Corporation | LOG OF BO | RING | NUMBER | | | | |
|------------------|-------|-------------|-----|---------|--|----------------------|--------------|--------------------|--------------|----------------|--------------|--------------|
| PROJE | | | | 151 | cui pui a ci un | CLIENT | | | | | | |
| | | | | Co | ntamination Evaluation | Illinois | Atta | rnev Care | | E.P.A | | |
| SITE L | | | _ | | TEMPTICALION CYATGACTON | 1 11111013 | | O- meons | | | | юти |
| Напт | | | | an | a | | | TONE | 1 | • | A | • |
| | | | _ | | | | 1 | - | - | | | - |
| | | | NCE | | | | 1 1 | PLASTIC LIMIT % | W/ | NTER | _ | 9U19 HT % |
| z | | 4 | ITA | ll | _ | | ¥- | X | | 0 — - · | | Δ |
| ELEVATION | 0 | BAMPLE TYPE | 810 | Ž | Description of Mai | ERIAL | \$ | 10 | 20 | 10 | 40 | 50 |
| ELEVAT DEPTH | AMPLE | 37. | PLE | OVERY | | | DAY 8 /FT | • | | | | |
| | I | 3 | 3 | lul | | | EN S | (M) | M6466 | | | _ |
| X | à | • | 4 | | SURFACE ELEVATION +100 | .1' | 5 | 10 | ETRATIO | - | OLOWS/F | Y 50 |
| | 1 | SS | | П | "Д" | | | 4 | | | | Γ |
| $\equiv \exists$ | | | Н | Ħ | | | | | | | ſ | 1 |
| - | 2 | SS | | Ш | | | | 2 | <u> </u> | <u> </u> | | <u>L</u> |
| = | · 3 | SS | | | Fine Sand, little Silt-I | | | | à | | | |
| 5.11 | | - | H | H | slightly dark gray-medi (SP-SM) Strong chemical | | \vdash | - | # | ├ | | ┼ |
| $\equiv \exists$ | - 4 | SS | | 出 | Fine sand, trace silt-gr | 1 |] | 1 | 7 | 1 | | ł |
| | -5 | SS | | 田 | medium dense-saturated- | | | | × | | | |
| | 6 | SS | H | H | Moderate to slight chem | |]] | | ` | 1 | L_ | 1 |
| 9.0 | , 0 | 33 | Ш | 出 | · | | | | | | 7 | <u> </u> |
| | | | | | END OF BORING | | | | 1 | 1 | [| [|
| \equiv | | | | | | | | 1 | | 1 | 1 | 1. |
| === | | | | | "A" - Silty fill, fine s red & slightly li | and, little b | rick. | crace con | grete | dark | gray | 1 \ |
| | | | | | Strong chemical o | | | יושני ונס צ | quura' | •ea-(| P(1-F) | , |
| === | , | | | | - | | | | | 1 | } | į |
| | | | | | CASING: 10' of 4" | 1 |] | | | 1 | Į | 1 |
| == | | | | | Set 2" PVC well @ 8' | , | | } | } |] |] | |
| | | | | | JEG & FYG WELL & O | | | - | | | 1 | |
| == | | | | | | | [[| | | | 1 | |
| === | • | | | | | | | | 1 | { | | |
| === | | | | | | | | Ĭ | | | 1 | l |
| === | | | | | | | | Ì | | | } | l |
| === | | | | | | | | } | 1. | 1 | 1 | 1 |
| | | | | | | | [] | l | ļ | 1 | 1 | |
| \Rightarrow | | | | | | | | j | } |] | | ļ |
| | | | | | | | } | | 1 | 1 | } | 1 |
| | | | | | | |]] | | | 1 |] | j |
| | | | | | | | [| } | | ļ | l | |
| | | | | | | | | 1 | | | [| |
| | | | | | | | | | 1 | 1 | 1 | • |
| | | | | | | | | | | 1 | | |
| | | | | | | | | ł | | l | } | 1 |
| \equiv | | | | | | , | | | | l | 1 | ļ |
| | W | ATION | لب | <u></u> | | TY LINES SETTINGS OF | M 77755A | 191-91711 THE T | Apper 71 av | 1 MAT 24 | - | |
| WL | 31 | | | \ | | 7 120 100 | | IL TESTIN | | | | |
| | | | | | | | | 111 PP1 | NGSTER | ROAD |) | |
| WL | | BC | R | _ | ACR BORING COMPLE | | | RTHBROOM | | | \$ 4000 | |
| | | | | | RIG Rotary FOR | -uaustariid | ~ | AUL VA / il | fare : | | 200 | 10 |

| OWNER Steel Container Co | ornoration | LOG OF BORING NUMBER | | | | | | | | |
|--------------------------------------|--|--|---|--|------------------------------|--------------------|--------|--|--|--|
| PROJECT NAME | 01 501 4 (1011 | CLIENT | | | 11 5 | E.P.A. | | | | |
| | amination Evaluation | | is Ati | tornev | | l's Off | ice | | | |
| SITE LOCATION | | | | C- 486 | ********** *** | - | | | | |
| Hammond, Indiana | | | | 1000 | 2 2 | 3 4 | | | | |
| TION NO. TYPE DISTANCE | DESCRIPTION OF MAT | ERIAL | DRY WT. 6./FT.3 | PLASTIC WATER LIGHT 14 LIMIT 14 LIMIT 14 LIMIT 15 LIMIT 1 | | | | | | |
| BAMPLE BAMPLE BAMPLE BAMPLE | SURFACE ELEVATION +99. | 4' | C N C N C N C N C N C N C N C N C N C N | ⊗ | STANSARO PENETRATIC 20 | 30 40 | owe/FT | | | |
| 1 SS 1 | Silty fine sand,little (roots-slighty brown & da loose-saturated-(SM) Strong chemical odor | | | 8 | | | | | | |
| PA | Silty fine sand, little p | eat-dark | | 4 | % ' | + | | | | |
| 5.0 30 | gray-medium-saturated-(S | M-PT) | | 1 | | 1 1 | | | | |
| | Layers of peat-strong ch | | [| | \mathcal{J} | | | | | |
| | Fine sand,trace medium t gravel & silt-grayish br | co coarse cown-medium | | | | | 1 | | | |
| - 28 7 7 | dense-saturated-(SP) | | | | | | | | | |
| -5 SS | Slight odor @ 5.0' | | | | | × | | | | |
| | END OF BORING | | | Ī | | [| | | | |
| | FILE ALL DAILTING | | | 1 | - | | | | | |
| | CASING: 10' of 4" | | | | 1 | | 1 | | | |
| | | | | | |]] | | | | |
| | Set 2" PVC well @ 8' | | | | 1 | | | | | |
| | | | | | | | | | | |
| | | | | | | | 1 | | | |
| | | | | | | | 1 | | | |
| | | | | | | | 1 | | | |
| == | | | | 1 | | | 1 | | | |
| = | | | | | | | 1 | | | |
| | | | | | | | | | | |
| | | | | | 1 | | | | | |
| | | | | | | | İ | | | |
| | | | | 1 | | | | | | |
| | | | | | Ì | | | | | |
| === | | | | | ļ | | 1 | | | |
| | | | | | | | | | | |
| == | | | | | | | | | | |
| | | | | | | |] | | | |
| | | | | | j | | ŀ | | | |
| | | | | | | | | | | |
| THE STRATIFICATION LIN | | Y LINES BETWEEN 90 | | | | | | | | |
| WL 1' | WS on WD BORING STARTED | 5/22/80 | 30 | | TING SI PPINGSTE | ERVICES IN ROAD | , INC. | | | |
| WL BCR | ACR BORING COMPLET | | | RTHOR | OOK | ILLINOIS | | | | |
| WL | RIG ROTATY FOR | POREMAN SterlingAPP'D BY LKA/j STS JOB NO. 20919 | | | | | | | | |

| owner Steel Container Corporat | ion | 106 OF 80 | OF BORING NUMBER | | | | | | | |
|-----------------------------------|---|------------|--------------------|-----------|--|---------------|----------|----------|--------------|--|
| PROJECT NAME | | CLIENT | | | | | | | | |
| Ground Water Contaminati | n Evaluation | Illinois | Atto | rney | Gene | ral's | Offi | ce | | |
| SITE LOCATION | | | | φ | /************************************* | | rnesen | E STREM | 9 711 | |
| Hammond, Indiana | | | | | <u> </u> | 2 | 3 | + | 3 | |
| * \$ C Z C . | ESCRIPTION OF MATERI | IAL | DRY WT. 8./FT.1 | u | 16TIC HT % X | com1 | TENT % | <u>-</u> | 7 | |
| AMPLE RCOVE | | | | | | | | | | |
| | ELEVATION +99.3' | | CNIT | Ć | S PEN | TRATIO | | nows/F | · • | |
| | ne Sand, trace fine | | | 9 | 1 | ĺ | 1 | | | |
| | lark gray-very loos rong chemical odor | e-saturat | -0- | 3 | 2/6" | † | | | | |
| 2A | ne sand, little pea | C.brown 1 | | 3 | | | | | | |
| a collin to dark | gray-very loose-sa | | | | K | | | | | |
| | of neat | | 1 | I | | 1 | | | 1 | |
| Fine sa | id, little silt-gray | 1Sh | | | V. | | ! | | | |
| Modora | edium-saturated-(SP e chemical odor | (-SM) | | | $\overline{}$ | - | | | | |
| RB | ; chemical oddi | Å | . } | | l | ` | | | | |
| 10.0 Fine Sa | id, trace gravel, med | ium to | ĺ | | ſ | | | | | |
| | and & silt-grayish | | ł | | | | | | -38 | |
| | nse-saturated-(SP) | | ľ | | | ĺ | | | | |
| RB Moderat | e odor | | 1 | | } | [| | | | |
| | | ł | 1 | | | | 761 | $V \mid$ | | |
| 5 00 11 | | | | | | | Z | | | |
| Gravel | medium to coarse | | | | | | | | (2) | |
| RB saturat | light gray-very de | ense- | 1 | | | | | | | |
| | nd, trace medium to | coarse | | | | - | | | | |
| | silt-grayish brown- | | 1 | | | ļ | | Y 1 | | |
| saturat | ed-(SP) | | Ī | | l | ł | | | i | |
| 7 SS | | j | j | | [| | V^{-} | | | |
| RB | | | ļ | | | / | | | | |
| | ay, trace gravel-gr | ay- | | | | 17 | | | | |
| RB stiff-n | edium-(CL) | 1 | | | 1 | / | | | | |
| 68 SS | | 1 | | * | 0 9 | { | | | | |
| | | j | j | | İ | , | | | | |
| RB | | | ļ | | | ł | | } } | | |
| | | | ł | | | | | | | |
| | BORING CASING:25' | of 4" | | AT TE | DATE | PEN | אנחנוד | 120 | | |
| | PVC well @ 25' inder fill,little t | opsoil.tr | | | | | | | | |
| | sist-(Fill) Strong | | | | | | | | | |
| THE STRATIFICATION LINES REPRES | IT THE ASSESSMENT COMMENTS | | | (M. B. T. | 744 7 | A 11 24 7 1 2 | MAY E- | \$8484A | | |
| | BORING STARTED 5/ | | | | | | | S. INC | | |
| | | | | | | GSTEN | | | _ | |
| WL BCR AC | BORING COMPLETED | コノムム/ ひひ 屋 | MO | RTHE | ROOK | 16 | LINO | \$ 6006 | 2 | |
| WE 50% A | RIG Rotary FOREM | | | | | | | | 1.0 | |

| | | | ſ |
|--|---|--|------------------|
| APPE BY LKA/j STS JOB NO20919 | AND Rotary FOREWASterling A | | ¥ |
| OOK (LLING | ACR BORING COMPLETED 5/23/80 | ec» | ۽ |
| UCIT TENTING MERCHICEN TO AD | MEE on WD BORING STARTED 5/23/80 | 4.5' | ž |
| TYPES IN-SITU THE TRANSPITON MAY BE GRABUAL | LINCO REPRESENT THE APPROXIMATE DOWNSON LINES SETWEEN SOM | THE STRATIFICATION | |
| | | | |
| | CASING: 10' of 4" Set 2" PVC well @ 8' | · · · · · · · · · · · · · · · · · · · | |
| ray-medium-saturated-(SM) ease in blackness bottom 4" n sand-dark gray-very dense- | Silty fine sand-black & dark g Very strong chemical odor; incr Fine sand, trace gravel & mediusaturated-(SP) Strong chemical odor | | |
| | Gravelly sand-brown & gray-very dense-saturated-(SP) Chemical odor END OF BORING | \$ | |
| 2 4 | STITY fine sand-black-very dense- saturated-(SM) Chemical odor | 6 SS SS | |
| 188 | Strong chemical odor | ╂ | J J |
| AB 189 | blue & yellow precipitals Silty very fine sand-black-loose- | 2 SS | |
| - tu | SURFACE ELEVATION +100.4' Silty fill, fine sand, little cinders, trace gravel & wood-black-loose- | SAN | HH |
| TARTIC WATER LIGHT V. | DESCRIPTION OF MATERIAL | APLE NO APLE TYPE APLE DISTANCE COVERY | LEVATION EPTH |
| O- UNGONFINES COMPRESSIVE STRENGTH TONGUET 1 2 3 4 5 | à | SITE LOCATION Hammond, Indiana | Ham |
| U.S.E.P.A. s Attorney General's Office | ntamination Evaluation [1] [1] | NAME | Bround |
| | | e) Container | Stee |
| | | | |

| OWNER Steel Co | \n+- | iss | | Corporati | 00 | | LOG OF BO | RING | NUMB | ER | | | | |
|--------------------------------|-------------|--------------|---------------|----------------|--------------------------------------|-------------|----------------|-------------|--|---------------|-------------------|---------------|-------------|-----|
| PROJECT | | | =- | corporati | UII | | CLIENT | | | | । इ | E.P.A | <u> </u> | |
| | | _ | Con | taminatio | n Evaluation | 1 | Illinois | Atto | rney | Gene | | | | |
| SITE LOCA | TIOI | • | | | | | | | 0- | 10000FT | | | E STREM | eTH |
| Hammond. | , In | dia | ana | | | | | | | 1 | 2 | 3 | 4 | 5 |
| ELEVATION DEPTH AMPLE NO | BAMPLE TYPE | PLE DISTANCE | OVERY | 0 K | SCRIPTION OF | MATERI | AL | F DRY WT. | PLA UN | 10 10 | CONT | TER PENT % | LIM | 7 |
| | 1 3 | Z | S S | SURFACE | ELEVATION | +100.2 | | LNIT | | S STAN | HEARS LTRATION | • | LOW'S F | • |
| | 22 | H | H | | | | | | - | 36 | | | | |
| | PA | Щ | Щ | Silty fi | ne sand, trac | e grav | el,coarse | | 2 | | <u> </u> | | | |
| - 구 | SS | | H | sand & re | oots-dark gr | ay-med | ium- | | | 70 | | | | |
| 24 | L PA | Щ | Ħ | | d-(SM)Partly d,little gra | | | | | | | | | |
| 5.0 3 | SS | | П | | slightly dar | | | | | 1 | | | | |
| == | RB | | 井 | saturate | d-(SP-SM) | | | | | ` | \ | } | | |
| -4 | SS | | | | d,trace grav | | | | | 1 | | 1 | | |
| | 28 | | H | | and-light br | .own-we | dium- | | | 1 | V | ŀ | | |
| - 5 | SS | ш | Н | saturate | d -(SP) | | | | | • | | • | | |
| 10.0 | 00 | | | | | | | | | 1 | | Į | | |
| 6 | SS | Щ | | | | | | | | | Ī | 1 | | |
| | RB | | | | | | | | | 1 | 1 / | l | | |
| | | | | | | | | | | l | | | | |
| 15.0 | | | | | | | | | | | | <u> </u> | | |
| — | SS | | Щ | | d, little sil | | | | | | A | | | |
| | | Н | | | dium to coar brown-satura | | | | | | / / | | | |
| | RB | | | Medium to | o coarse san | | | | | | / | | | |
| 20-0- | | | | seam @ 2 | 1' | | | | | | / | | | |
| 8 | SS | Н | H | | | | | i | | | 1 | | | |
| <u></u> | دد | Щ | H | | | | | | | | | | | |
| | RB | | | | | | | | | | ľ | | | |
| | | Ш | | | | | | | | | <u> </u> | | | |
| 25_0 | RB | | | | ay,trace san ff to very s | | ale- | | | | <u> </u> | | | |
| 20.5 | SS | | | Ai al-aci | +=: 7 3 | | _ | | | *0 | -o* | | | |
| | | П | Н | END OF BO | ORING | | | | *CAI | IBRAT | ED P | NETR | DMETE | ₹ |
| | | | | | | | | | | | j | | | • |
| | | | | "A" - Fi | ll,sand,litt | le cin | ders-dark | brow | n-loc | se-mo | ist- | Fill | | |
| | 1 | | | רז - ים SA: | <pre>11,cinders,1 turated-(Fil</pre> | 1) 51 | ight odor | t-da eng | rk gn sible | ay-10 sluc | ige) | | | |
| | | | | | | | | | | - ' ' ' |] - ' | | | |
| | | | | CASING: | 25' of 4" | Set | 2" PVC w | ell (| 25' | | <u> </u> | | | |
| *108 91 | PATIF | CATI | 0 11 L | REPRESENT | | | 468 OETWEEN SO | | | | | | | |
| WL 0.5 | | | | WS on WD | BORING STAR | ITED 5 | /21/80 | 50 | | | G SEI | | S. INC | · |
| WL | BC | R | | ACR | BORING COM | PLETED | 5/21/80 | NC | RTHE | | | | 6006 | 2 |
| WL | | | | | RIG Rotary | | | | | | | 08 NC | . 2091 | 19 |
| | | | | | | | | · | | | Ь— | | | |

| OWNER Steel Co | nta | ine | r | Corporation | | 106 OF 80 | RING | NUMBI | ER | | | | | |
|---------------------------|----------------------------|----------|-------|-----------------------|--|-------------------|--------|----------------|--------------|-----------------|------------|--------------------|--|--|
| PROJECT N Ground W | | _ | on | tamination | Evaluation | CLIENT Illinoi | s Att | orney | | J.S.E eral' | | ce | | |
| SITE LOCA | | | | | · · · · · · · · · · · · · · · · · · | | | ئ ة | 0#8/FT | CO COM | PRESSIVE . | STRENGTH | | |
| PEFETH DEPTH NO. | BAMPLE TYPE | DISTANCE | OVERY | | RIPTION OF MATE | SRIAL | DRY WT | 2 3 4 3 | | | | | | |
| ELEVAT DEPTH SAMPLE | | SAMPLE | RECO | SURFACE ELE | | _ | UNIT | Q | STAM PENE | GARD TRATION | | 9 WS FT | | |
| 1 | SS PB | | Щ | DIACK-Medi | sand,little o um-saturated-(| inders- SM) | | × | | | | | | |
| - 2A | | | 世 | Partly orga | anic | | | 蹇• | × | | | | | |
| 3 4 5 | 28 SS SS PB SS | | | medium to dight brown | little gravel, coarse sand & n & slightly d urated- (SP) r | silt- | | | × | | | | | |
| 9.5 | | | | END OF BOR | ING | | | | | | | | | |
| | | | | | ,cinders,littl rated-(Fill) | e topsoil,t | race | roots | -blad | k-100 | se- | | | |
| | | | | |)' of 4" | | | | | | | | | |
| | | | | Set 2" PV | C well @ 8' | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | : | | | | | | | | |
| | | | | | ************************************** | | | | 745 | | MAT 55 6 | | | |
| WL 0.5 | -01154 | | , | | ORING STARTED | 5/21/80 | | | | | VICES | | | |
| WL | 80 | R | | | ORING COMPLET | | NC | I Drthe | | IL | ROAD | 60062 | | |
| | | | | | es Rotary Fore | | | | | | | | | |

| OWNER | | | | | | | | LOG OF BO | RING | NUMB | ER | | | | | |
|--------------------|------------|-------------|---------------|-----------|----------------------|------------------------------|----------|--|-----------|--|---------|----------|--|--|----|--|
| Steel | | | | er | Corporati | on | | W-9A | IT | | | | | | | |
| | _ | | | Con | taminatio | n Evaluatio | n | CLIENT U.S.E.P.A. Illinois Attorney General's Office | | | | | | | | |
| SITE LO | | | | | | | | | | 0- | /HEON/1 | HES COM | | E STRENGT | PN | |
| Hammo | nd, | In | dia | ana | | | | | | <u></u> ' | 1 | 2 | , | 4 9 | | |
| ELEVATION DEPTH | AMPLE NO. | BAMPLE TYPE | PLE DISTANCE | OVERY | O.E. | SCRIPTION OF | ' MATERI | AL. | F DAY WT. | 10 20 10 40 10 | | | | | | |
| | ¥ (| 740 | 814 | NEC | SURFACE I | ELEVATION | +100.0. | | CNIT | • | S PEM | TRATION | 10 4 | 0LOWS/FT | | |
| | 1 | SS | | | | ne sand,tra | | | | * | | | | | | |
| | 2 | SS | | | gray-med Partly o | ium-saturat rganic | ed-(SM) | | | | | | | | | |
| | Ţ | ** | | | Fine san | d, little si | lt,trac | e gra- | | | | - | - | | | |
| 5.11 | `3A | 0.0 | П | П | | dium to coam wn-medium-sa | | | | %" | À | | | | | |
| | -4 | SS | | 耳 | L | d.trace med | | | | | } | x | | | | |
| | | R.B | \Rightarrow | | sand & s | ilt-light b | | | | | | <u> </u> | | | | |
| | -5 | SS | Щ | 4 | (SP) | | | | | | | ¥ | | | | |
| | -6 | SS. | П | | Fine sand | d, trace grad | vel & s | ilt- | | | | | | | | |
| | -60 | AS | \forall | \exists | DI OMII-IIIGI | A I MIL DE LAI G | ceu-(sr | ' | | | | | | | | |
| | - | | + | \forall | Fine sand | d,trace med | ium san | d- | | | | | | | | |
| 14.5 | 6 | SS | Ч | Ц | | brown-very | | | | | - | | | 1 | | |
| | | | | ľ | Saturate | <u>u-(3P)</u> | | { | | | | | | | | |
| | | | ١ | | END OF BO | ORING | | | | | | | | | | |
| | | | | | "A" - Ciı | nders,little | e ashes | -rust bro | ın å | dark | gray- | loose | - | | | |
| | | | | ļ | | ist-(Fill) | | | | | | | | | | |
| | | | .] | | | 15' of 4" | | | | | | | | | | |
| | | | | | | Stainless St | teel we | 11 @ 13' | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | ł | | | | | | | | | | | | | | |
| | 1 | | | | | | | | | | | | | | · | |
| | | | | | | | | 1 | | | | | | | : | |
| | | | | | | <u>-</u> | | | | | | | | | | |
| | | ATION | BATH | | | | | 1 | | | | | | S. INC. | | |
| | <u>.5'</u> | | | | WS on WO | BORING STAI | | | | 1 | II PPIN | GSTEN | | _, | | |
| ML | | 90 | R | | ACR | BORING COM | | | | RTHO | | | | 8 60062 | | |
| WL | | | | | | RIG Rotary | FOREMA | Sterlir | 19 | -AFK | A/jl | STS J | UE NO | 20919 | } | |

| OWNER | | | LOG OF BOR | ING I | NUMBI | ER | | | | | |
|--|--------------|--|--------------------|-----------------------|---|------------|-----------------|------|-------------|--|--|
| Steel Contain | er Corporat | ion | W-10 | | | | | | | | |
| PROJECT NAME Ground Water | Contaminatio | on Evaluation | CLIENT Illinois | Attor | ney | | .S.E. | | 2 | | |
| SITE LOCATION | | | | | | | | - | STREMSTH | | |
| Hammond, Indi | ana | |] | Į | | DNS/FT | | 4 | 5 | | |
| ELEVATION DEPTH SAMPLE NO. SAMPLE TYPE | N N | SCRIPTION OF MATER | RIAL | T DRY WT. BB./FT.* | PLASTIC WATER LIGHTS LIMT% CONTENT% LIMT% 10 20 30 40 50 | | | | | | |
| SAMPLE SAMPLE SAMPLE SAMPLE | | ELEVATION +100 | | LE | Q | PENE | TRATION | _ | OWE/FT | | |
| 1 55 | | ne sand, little br | | | | ¥ | | | | | |
| | | low brown & dark (ill) Strong odor | gray-meldum | - | | <i>V</i> ` | | | | | |
| 2 SS | | e sand, roots & bi | rick- | | z | | | ľ | | | |
| PA | | se-saturated-(PT) | | | _/ | <u> </u> | | | | | |
| 5.0 3 55 | ∏ odor-orga | inic matter | • | | | | | | ľ | | |
| · (A | | ilt, trace sand & | | | ×. | | | | | | |
| 4 SS | | lark gray-medium- | saturated- | | 3/6 | 30 | | | | | |
| AA RK | | | | | | * | 76 " | | | | |
| | | i,trace coarse sam | | 1 | | 8 | } | | | | |
| 9.3 5 SS | | o rown-medium-satu ilt (SM) 7.0-7.5' | rated-(SP) | | | | - | | | | |
| == | Strong | | 1 | 1 | | | | | | | |
| | | W-1 | | - 1 | | | | | | | |
| | END OF BO | RING | · | - 1 | | | | ! I | | | |
| == | | | | Ì | | | | 1 | } | | |
| | CASING: | 10' of 4" | ŀ | | | | ŀ | | | | |
| | Sat 2" 5 | PVC well @ 8' | 1 | 1 | | | | | | | |
| | Jec 2 . | TC WELL G | į | | | | | | | | |
| | İ | | 1 | | | | | | | | |
| | i | | \ | - 1 | | | | 1 | | | |
| | | | 1 | į | | | | | | | |
| | | | | I | | | | | | | |
| | - | | - 1 | 1 | | | | | | | |
| | 1 | | ļ | l | | | | | } | | |
| | | | • | 1 | | | | | 1 | | |
| | | | 1 | ŀ | | | | | | | |
| | į | | | - [| | | | | 1 | | |
| === | | | 1 | i | | | | | | | |
| == | | | | | | | | | | | |
| | 1 | | ļ | 1 | | | | | 1 | | |
| == | 1 | | İ | 1 | | | | | | | |
| === | 1 | | ł | l | | | | | | | |
| === | | | 1 | 1 | | | | | | | |
| | | | | İ | | | i | | | | |
| | | | | | | | <u> </u> | | | | |
| THE STRATIFICATION | | THE APPROXIMATE BOUNGET | LINES SETWEEN SOIL | | | | | | | | |
| WL [1 | WS on WD | BORING STARTEDS | | 50 | | | G SEF IGSTEN | ROAD | , INC. | | |
| WL BCR | ACR | BORING COMPLETE | | | | ROOK | | | 60062 | | |
| | | RIG Rotary FOREN | | | | | | | 20919 | | |

| OWNE | R | | | | | | | LOG OF 80 | RING N | IUMBER | | | |
|--------------------|-----------|-------------|--------------|---------------|-----------|-------------|-------------------|--------------------|---------|------------------|----------------------------|-------------|------------|
| | | | | r | Corporati | on | | 8-11 | | · | | | |
| Grour | | | _ | on. | taminatio | n Evaluat | | CLIENT []]inois | Atto | υ. rney Gene | S.E.P. | | |
| SITE L | | | | | | | | | | O- UNEOWN | NEO COMPI | | HEMSTH |
| Hammo | ond, | Inc | dia | na | | | | | | TONE/FT | ; ; | 4 | 5 |
| ELEVATION DEPTH | AMPLE NO. | BAMPLE TYPE | PLE DISTANCE | COVERY | DE | SCRIPTION | OF MATERI | AL | DRY WT. | PLASTIC UMT % | CONTE | | 10 |
| ELEVAT DEPTH | BAMP | SAMP | BAMPI | RECO | SURFACE | ELEVATION | | | UNIT | Ø ≥€™ | HOARD ETRATION 20 30 | SLOW 40 | 9/P7 90 |
| | 1 | SS | | | Silty fi | ne sand,t | race grav | el & | | 4 | T | Ī | |
| \blacksquare | | - | \mathbb{H} | H | brick pi | eces-medi | um-(Fill) | | | | ┼┼ | | |
| | 2 | SS | 44 | Ħ | Silty fi | ne sand, t | race grav | el-black- | | | 1 1 | | 1 |
| 5.0 | 3 | SS | Ш | 出 | medium-sa | aturated- | (SM) ge rubber | | | * | | | |
| 5.0 6.0 | 4 | SS | | Щ | material | | | y elastic | | 3 | | | 1 |
| | | | | | END OF BI | DRING | | | | | | | |
| | _ | ATIP | BATH | • ** . | | | 478 000000 U | | | IL TESTIN | | | |
| WL | 3, | | | | WS on WD | | TARTED 5/ | | | 111 PF 16 | HESTEN F | DAD | |
| WL | | BC | R | | ACR | | OMPLETED | | | RTHBROOK | | NOIS 40 | |
| WL | | | | | | RIG Rota | TV FOREMA | Sterlin | APPO | LKA/il | 212 10 | ■ NO 20 | 919 |

SOIL TESTING SERVICES, INC.

GRAIN SIZE DISTRIBUTION DATE: 10-16-80

BORING NO. : / STS JOE NO.: 20919

SAMPLE NO. : 6 PROJECT : -

DEPTH (FT.) : - W/C: -

CLASSIFICATION FINE SAND, TR. M-C LL : - PL : - PI : -

SAND & FINE GRAVEL-LT. BROWN-(SP)

SIEVE ANALYSIS-

SAMPLE WEIGHT: 114.06 GRAMS

| SIEVE | WEIGHT | PER CENT | PER CENT |
|-------------|----------|----------|----------|
| SIZE | RETAINED | RETAINED | PASSING |
| .375* | 0.00 | 0.00 | 100.00 |
| #4 | 1.67 | 1.46 | 98.54 |
| \$10 | 2.30 | 2.02 | 96.52 |
| #20 | 1.40 | 1.23 | 95.29 |
| #40 | 0.38 | 0.33 | 94.96 |
| #60 | 0.70 | 0.61 | 94.35 |
| # 80 | 9.27 | 8.13 | 86.22 |
| #100 | 31.50 | 27.62 | 58.60 |
| ≇200 | 66.57 | 58.36 | 0.24 |

SOIL TESTING SERVICES, INC.

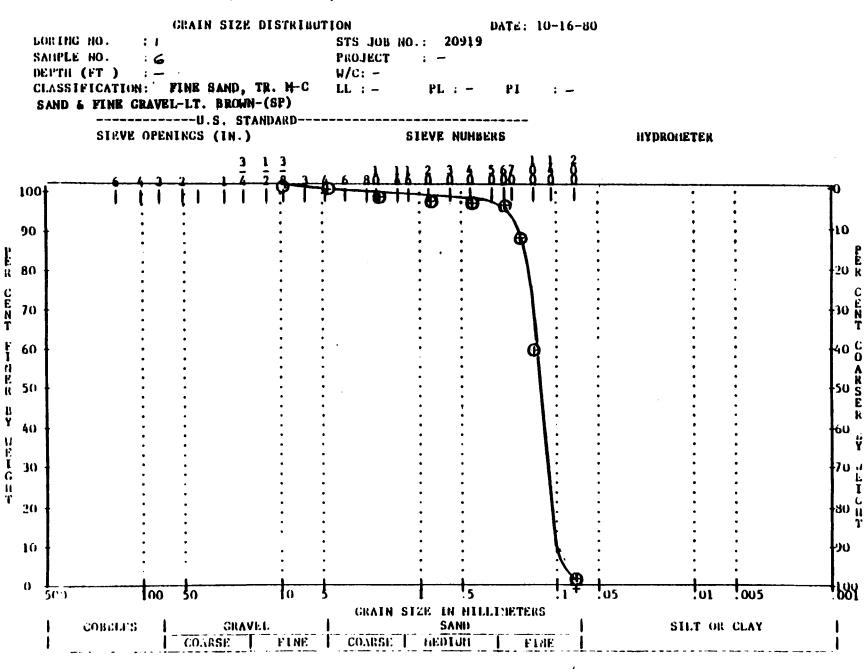


TABLE 1

Calumut Container Sample List

| EPA Sample Identification | Sampling Date | Sample Location | Sample Type and Description |
|------------------------------|--------------------------|-----------------|--|
| G001 | 5/21-23 6/3-4 6-17 | W- I | GH GH, turbid, sl. odor GH, sl. turbid, chemical odor |
| G002 | 5-27 6-4 6-17 | W-2 | GW, v. turbid, sl. odor GW, turbid GW, fairly clear, sl. chemical odor |
| G003 | 5-23 6-5 6-17 | W-3 | GW, v. turbid GW, lt. green GW, lt. green, chemical odor |
| G004 | 5-23 6-3 6-17 | W-4 | GW, v. turbid, sl. sulfur, lt. green GW, lt. green GW, lt. green, strong chemical odor |
| G005 | 5-22 6-3 6-17 | W-5 | GH, v. turbid GW, v. turbid GW, sl. turbid, sl. odon |
| G006 | 5-22 6-3 6-17 | ₩-6 | GW, brownish, sl. septic odor GW, v. turbid, v. strong odor GW, brown, sulfur odor |
| G007 | 5-27 6-4 6-17 | W-7 | GW, bright green sl. odor GW, green GW, bright green, strone chemical odor |
| G008 | 5-21 6-3 6-17 | W-8 | GW, v. turbid, sl. solvent odor GW, turbid GW, turbid, sl. odor |

Calumet Container Sample List

| EPA Sample Identification | Sampling Date | Sample Location | Sample Type and Description |
|------------------------------|------------------|----------------------------|--|
| G009 | 5-21 6-3 | ₩-9 | GW GW, v. turbid, sulfur odor |
| | 6-17 | | Gw, fairly clear, sl. odor |
| GO9A | 5-21 | W-9A | GW, v. turbid, sl. solvent odor |
| | 6-3 | | GW, turbid, sl. sulfur odor |
| | 6-17 | | GW, sl. turbid, sl. odo |
| G010 | 5-22 6-3 | W-10 | GW GW, black, v. turbid, sulfur odor |
| | 6-17 | | GH, very turbid, strong sulfur odor |
| W-100 | 5-21 | SCC. Building Private Wall | GW, clear liquid, no odor |

GW - Ground Water

Calumet Container Sample List

| EPA Sample Identification. | Sampling Date | Sample Location | Sample Type and Description |
|-------------------------------|------------------|------------------------------------|-----------------------------------|
| S - 501 | 5-21 | SW SCC. Building | SW, Green |
| S-502 | 5-21 | M Center SCC. | SW, Grayish |
| S - 503 | 5-21 | Concrete pit on H. Bldg. | SW, Pinkish Sludge |
| S-504 | 5-21 | Powderhorn Lake | SW, Clear |
| S-50 5 | 5-21 | W SW SCC 150' | S, black, elastic, viscous sludge |
| S - 50 6 | 5-21 | 175' W SW SCC. | S, clay, w/black oil material |
| S-507 | 5-21 | 150' W SW SCC. | Red powder & red cake |
| S - 508 | 5-21 | 70' W SCC. | Black oil-like sludge |
| S - 509 | 5-22 | E of RR, Center of burial disposal | Black sludge |
| S-510 | 5-22 | E Central burial disposal | Green-yellow sludge |
| S-511 | 5-22 | E Central Burial disposal | Black Sludge |
| S-512 | 5-22 | E Central Site S of S511 | Black, yellow, pink sludge |
| S - 513 | 5-23 | S C.C. on Raymond by a fence | SH, v. turbid ponded |
| S-601 | 6-17 | 200 yds. NE C.C. | SW, clear pond water |

S - Soil SW - Surface Water

Calumet Container Sample List

| EPA Sample Identification | Sampling Date | Sample Location | Sample Type and Description |
|------------------------------|------------------|--|---|
| 101 X (a) | 4-15 | 30' W of Loading Dock; Bet. RR & Berm | Green Ponded Liquid |
| 102 X (a) | 4-15 | 75' SW of Loading Dock; E. of Marsh | Marsh Water |
| 103 X (a) | 4–15 | 20' NW of Loading Dock; E. of Berm | Cloudy Ponded Liquid |
| 104 X (a) | 4-15 | 30' W of Loading Dock; Bet. RR & Berm | Moist Soil |
| 101X | 4-7 | 100' West of Loading Dock | Green, Transluscent, Ponded Liquid |
| 1 02X | 4-7 | 300' W SW of Loading Area | Colorless Marsh Water |
| 103 X | 4-7 | 300 yds. SW C.C SE Edge Marsh, 50' N R.R. | Colorless Marsh Water |
| 8-4 | 5-22 | W-4, 0-15' | Soil, Silty fine sand (Fill) Strong Chemical Odor |
| · | 5-22 | W-4, 7.5-9.0' | Fine sand, trace silt, moderate to sl. chemodor |
| B-2* | 5-22 | W-2, All Depths | Soil |
| 8-7* | 5-22 | W-7, All Depths | Soil |

^{*} See separate sheets for list of samples given to EPA

CALUMET CONTAINER SOIL SAMPLE LIST

| 8-1 | B-2 [*] | B-3 | B-4 | B-5 | B-6 |
|------------------------|-------------------------|-------------------|-------------------|-------------------|----------------------|
| S-1 (1) 0-1.5' | S-1 0-1.5' | S-1 (1) 0-1.5' | S-1 (1) 0-1.5' | S-1 (1) 0-1.5' | S-1 (1) 0-1.5' |
| S-2 (1) | S-2 (1) 1.5-3' | S-2 (1) Z-3.5 | S-2 (1) 1.5-3' | S-2 (1) 2-3.5' | S-2 (1) 2-3.5 |
| S-2A (1) | | | | | S-2A (1) 2-3.5' |
| | S-3 3-4.5 | S-3 (1) 4-5.5' | S-3 (1) 3-4.5' | S-3 (1) 4-5.5' | S-3 (1) 4-5.5' |
| S-3A (1) 4-5.5' | | | | S-3A (1) | |
| S-3A (1) | | | | | |
| S-4 (1) 6-7.5' | S-4 (1) 4.5-6' | S-4 6-7.5' | S-4 (1) 4.5-6' | S-4 (1) 6-7.5' | S-4 (1) 6-7.5' |
| S-4 (1) Dup. 8-9.5' | | | | | |
| S-5 (1) 8-9.5' | S-5 (1) 6-7.5' | S-5 8-9.5' | S-5 (1) 6-7.5' | S-5 (1) 8-9.5' | S-5 (1) 10-11.5' |
| S-6 (I) 15-16.5' | 5-6 (1) 7.5-9' | | S-6 7.5-9.0' | | S-6 (1) 15-16.5' |
| ; | S-6A (1) 7.5-9 | | | | S-6A (1) 15-16.5' |
| S-7 (1) ; 20-21' | S-7 9-10. <i>5</i> 1 | | | | S-7 (1) 20-21.5' |
| | S-7A 9-10.5' | | | | |
| S-8 (1) 25-26.5' | S-8 (1) | | | | S-8 (1) |
| | S-9 20-21.5' | | | | |
| | S-10 | | | | |

^{*}Samples split and given to EPA - Aurora

CALUMET CONTAINER SOIL SAMPLE LIST

| B-7 * | B-8 | B-9 | B-9A | B-10 | B-11 |
|-------------------|---------------------|--------------------|----------------------|---------------------|---------------|
| Surface Sample | S-1 | S-1 (1) 0-1.5' | S-1 (1) 0-1.5' | S-1 (1) 0-1.5' | S-1 0-1.5' |
| | S-1A | <u> </u> | | | |
| S-2 1.5-3' | S-2 | S-2 (1) 2-3.5' | S-2 | S-2 (2) 2-3.5' | S-2 1.5-3' |
| | S-2A | S-2A (2) 2-3.5' | | | |
| S-3 3-4.51 | S-3 | S-3 (1) 4-5.5' | S-3 (1) 4-5.5' | S-3 (1) 4-5.5' | S-3 3-4.5' |
| | | S-3A (1) 4-5.5' | S-3A (1) 4-5.5' | S-3A (1) | |
| S-4 4.5-6' | S-4 | S-4 (1) 6-7.5' | S-4 (1) 6-7.5' | S_4 (I) S_4A (I) | S-4 4.5-6' |
| S-5 6-7.5' | S-5 (1) | S-5 (1) 8-9.5' | S-5 (1) 8-9.5' | S-5 (1) 8-9.5' | |
| S-6 7.5-9' | S-6 (1) | | S-6 (1) 10-11.5' | | |
| S-6A 7.5-9' | | | S-6A (1) 10-11.5' | | |
| | S-7 15-16.5' | | S-7 (1) 13-14.5' | | |
| | | | S-7A (1) 13-14.5' | | |
| | S-8 (1) 20-21.5' | | | | |
| | S-9 | | | | |

^{*}Samples split and given to EPA - Aurora

Ground Water Elevations for Wells
Installed at the S.C.C. Site

| Well No. | Elevation* Ground Surface 5/27/80 | Elevation* 5/21-23/80 | Ground Wa 6/3-4/80 | ter Before 6/1//80 | Sampling 10/8/80 |
|------------|---|--------------------------|-----------------------|-----------------------|---------------------|
| 1 | 587.1 | 584.9 | 585.4 | 585.3 | 584.9 |
| 2 | 586.9 | 584.9 | 585.3 | 585.3 | |
| 3 | 584.9 | 584.6 | 584.7 | 584.7 | 584.4 |
| 4 | 586.9 | 584.7 | 585.1 | 585.0 | |
| 5 | 586.2 | 584.7 | 585.3 | 585.1 | 584.7 |
| 6 | 586.1 | 584.7 | 585.3 | 585.1 | |
| 7 | 587.2 | 584.8 | 585.4 | 585.2 | 584.8 |
| 8 | 587.0 | 585.2 | 585.4 | 585.3 | |
| 9 | 586.6 | 585.3 | 585.4 | 585.4 | 585.0 |
| 9 A | 586.8 | 585.2 | 585.4 | 585.4 | 585.0 |
| 10 | 586.8 | 585.3 | 585.6 | 585.5 | |

^{*} Elevations corrected to USGS Datum

STS Job No. 20919

TABLE 3

Surface Water Elevations taken on SCC Property and Surrounding Areas

| Surface Water Location* | Water Elevation | |
|--|-----------------|--|
| Powderhorn Lake | 585 . 1 | |
| Wolf Lake (West of causeway) | 582.1 | |
| Nolf Lake (East of causeway) | 582.4 | |
| 2860' N 570' E (Center SE arm of Wolf Lake) | 582.7 | |
| 1910' N 1020' E (South end SE arm of Wolf Lake) | 583.0 | |
| 1590' N 775' E | 583.1 | |
| 1590' N 360' E | 583.7 | |
| 1445' N 225' W | 585.0 | |
| 1105' N 105' W | 5 85 .0 | |
| 690' N 125' E | 584.3 | |
| 210' N 65' E | 584.8 | |
| 40' S 0' E | 584.9 | |
| 150' S 40' E | 584.9 | |

^{*}Referenced to SE corner - Section 32 - T37N R15E

TABLE 4

000179

United States Department of Interior - Geological Survey Primary Computation of Gage Weight Wolf Lake at Chicago, Illinois

Provisional Data for Water Year Ending September 30, 1980

Datum = 580.45

| DATE | MAX GH | MIN GH | MEAN | |
|-------|--------|--------|---------|---|
| _ | | (TIME) | | |
| 1 | | | | |
| 7-16 | 1.49 | 1.47 | 1.48 | |
| | | (0600) | | |
| | | 1.47 | 1.47 | |
| | | (1100) | - | |
| 7-18 | | 1.47 | 1.47 | |
| | | (0100) | | |
| 7-19 | | 1.47 | 1.48 | |
| | | (0100) | | |
| 7-20 | | 1.47 | | • |
| | | (1300) | • • • • | |
| | | | | |
| 7-21 | 1.53 | 1.46 | 1.52 | |
| | | (0200) | | |
| 7-22 | | 1.52 | 1.53 | |
| | | (1900) | | |
| 7-23 | | 1.51 | 1.52 | |
| | | (2000) | | |
| 7-24 | | 1.51 | | P |
| , • | | (0100) | | |
| | | J. 1 | | |
| ERIOD | 1.60 | 1.46 | | |
| | | | | |

| - | DATE | MAX GH | MIN GH (TIME) | MEAN GH | DATE | MAX GH (TIME) | MIN GH | MEAN GH ()()(1:50 |
|-------|--------|----------------|------------------|------------|--------|------------------|-------------|----------------------|
| | 4-22 | 1 60 | ١ ٨٥ | 1 60 | | (0100) | | |
| | 6-23 | | 1.60 | 1.60 | 4-33 | (0100) | (0900) | |
| | 4 - 34 | (1600) | (1600) | ١ ٨٨ | 0-66 | 1.63 | 1.61 | 1.62 |
| | 0-24 | 1.60 | 1.59 | 1.60 | 4 22 | (0100) | (1200) | |
| • • • | , 36 | (0100) | (1300) | , 50 | 6-23 | _ | 1.60 | 1.61 |
| | 0-62 | 1.59 | 1.59 | 1.59 | •• | (0100) | (0000) | |
| | | (0100) | (0100) | | PERIOD | | | |
| . • | 6-26 | 1.59 | 1.58 | 1.58 | PERIOD | 1.80 | 0.73 | |
| | 9-50 | (0100) | (1000) | 1.30 | | | | |
| | 6-27 | | 1.57 | 1.58 | | | | |
| | 9-21 | (0100) | (1600) | 1.30 | | | | • |
| | 6-28 | | 1.57 | 1.59 | | | | |
| | 9-50 | | (0100) | 1.37 | | | | |
| | 6-29 | (0400) 1.59 | 1.57 | 1.58 | | | | I . |
| | 0-69 | (0100) | (1200) | 1.30 | | | | |
| | 4-30 | 1.57 | 1.57 | 1.57 | | | | ; |
| | 9-30 | (0100) | (0100) | 113. | | | | : |
| | | (0100) | (0100) | | | | | ! |
| | 7-01 | 1.57 | 1.56 | 1.56 | | | | |
| | 1-01 | (0100) | (0300) | | | | | • |
| الحث | 7-02 | 1.56 | 1.55 | 1.56 | | | | |
| | 7-02 | (0100) | (1500) | | | | | : |
| | 7-03 | 1.55 | 1.54 | 1.55 | | | | |
| | , | (0100) | (1800) | | | | | |
| | 7-04 | 1.54 | 1.54 | 1.54 | | | | |
| | , , , | (0100) | (0100) | | | | | • |
| | 7-05 | 1.54 | 1.52 | 1.53 | | | | • |
| | - | (0100) | (0500) | | | | | |
| | | | | • | | | | · |
| | 7-06 | 1.52 | 1.51 | 1.52 | | | | |
| | | (0100) | (1600) | | | | | |
| | 7-07 | _ | 1.49 | 1.50 | | | | |
| | | (0100) | (1700) | | | | | |
| | 7-08 | 1.49 | | 1.49 | | | | |
| | | (0100) | (0100) | | | | | |
| . •- | .7-09 | | | 1.51 | | | | |
| | | (1100) | (0800) | | | | | • |
| | 7-10 | | | 1.52 | | | | |
| | | (0100) | (0100) | | | | | |
| | 7-13 | 1 1.52 | 1.52 | 1.52 | | • | | |
| | 1-1. | (0100) | | • • • • | | | | |
| | 7-12 | | | 1.52 | | | | |
| | 1-11 | (0100) | | | | | | |
| | 7-13 | | | 1.52 | | | | |
| | 1-1. | (0100) | | | | • | | |
| | 7-1 | | | 1.51 | | | | |
| | ,-1. | (0100) | | | | | | |
| | 7-1 | | | 1.49 | | | | |
| | 1-1 | (0100) | | • • • • | | | | |
| | | (0100) | | | | | | |

| , | 00613 | | |
|-----------------|--------|--------|-------|
| E AN | 1.53 | 1.53 | 1.52 |
| KIN GH | 1.53 | 20 · I | 1.51 |
| MAX GH | 1.53 | 1.03 | 1.52 |
| OATE | 2-07 | 5-08 | 5-09 |
| NAM GH GH | 1.66 | 1.65 | 1.71 |
| I ~ | ر ا | . m - | ้ เกิ |

-1

| | Č Č | m | r | u | - | | 0 | | - | 7 | ~ | 1 | - | | 2 | F. | • | | 4 | , | _ | | m | (* | • | | ú | | | | 2 | _ | _ | m | ď | _ |
|------------------|--------|------|----|--------|------|--------|------|----|--------------|------|------|------|--------|-----|-------|-------------|----------|------|----------|------|------|------|------|------------|--------|-----------|--------|------|----------|------|------|------|-------------|------|---------------|-----|
| K H O | | 1.5 | Ú | n T | 1.5 | | 1.5 | | <u>.</u> | 1.5 | 7 |) | .5 | | 1.5 | u | <u>.</u> | 1.5 | 74. |) | 1.54 | | 1.5 | U | , - | 1.54 | 3.5 | • | 1.54 | | 1.52 | | 1.0 | 1.5 | 4 | 0 |
| KIN GE | 1.5 | 1.52 | 00 | 00 | 1.5 | 0 | ŝ | 00 | 0.0 | 1.5 | 9 5 | 9 | 1.51 | | 1.5 | 0 0 1 | 10 | - | 9 5 | 00 | 1.5 | 0 | 1.5 | g v | 0 0 | 1.5 | 10010) | 00 | 1.5 | 00 , | 1.5 | 84 | J O | 1.50 | 90 | 0 6 |
| MAX GH | 1.5 | | | 00 | 1.5 | 0 | ŝ | 8 | v e | 1.5 | 0 5 | 00 | 1.52 | | 3.5 | 0 4 | 99 | | S N | 9 | 7.5 | 00 | 1.5 | 0 | 0 | 10 | 1,500 | 00 | S | 00 | 1.5 | 0 4 | 000 | | 0 | |
| OATE | 2-07 | 5-08 | |) | 5-10 | | 5-11 | | 71-6 | 5-13 | 5-14 | • | 5-15 | | .5-16 | F-17 | • | 5-18 | 5-19 | • | 5-20 | | 5-21 | 5.22 | J | 5-23 | 5-24 | | 5-25 | | 5-26 | 6.37 | | 5-28 | 7 00 00 | U |
| N TO | 1.66 | 1.65 | | 1.71 | ; | 1.70 | 1.77 | ; | 1.1 | 1.75 | | 1.69 | . 33 | - | 1.79 | . 77 | • | 1.74 | | 1.72 | | 1.70 | 1.68 | . 47 | 0 | 1.69 | | 1.68 | • | .00 | 1.65 | 45 | n D • | 1.65 | | • |
| MIN GH (TIME) | 1.6 | 1.65 | 00 | 9. | 8 | ~ 0 | | 8 | ~ 0 0 | 1:7 | 0 | O | (1900) | - 0 | 101 | 90 | 00 | ſ |) | 1. | 00 | 1.68 | 1-6 | 00 | 00 | 1.6 | ם ס | 1.6 | 00 | 9 9 | 1.6 | 90 | 9 | | 0 | , |
| MAX GH | ! | 1.66 | 0 | • | 0 | (1400) | 1.77 | 0 | (0)(0) | • | 0 | • | (0400) | • 0 | | 0 | • 0 | 7 | > | • | 0 | 1.71 | - | 0 | • 0 | - | 0 | • | 0 | • • | - | 0 | | | 8 | |
| DATE | 5-30 | 5-31 | | 6-01 | , | 20-9 | 6-03 | • | * | 6-05 | | 90-9 | 4-07 | | 6-08 | 90-9 | | 6-10 | | 6-11 | | 6-12 | 6-13 | 71-7 | # 1 B | 6-15 | | 6-16 | • | 6-17 | 6-18 | • | 77-9 | 7 | | ; |

| TO ZIX | A Z | DATE | MAX GH | MIN GH | MEAN GI | 00 |
|--------|--------|-------|--------|----------------------|------------|------|
| (2200) | . u | 4-12 | 1.8 | 0100 | 1.87 | |
| (5002) | 60.1 | 4-13 | 1900 | 0100 | 1.88 | |
| 1.55 | 1.56 | 4-14 | 0040 | 9 69 6 | 1.91 | |
| (1000) | + | 4-15 | 1.92 | (0100) | 1.92 | |
| 1.53 | i I | 91-4 | 0.0 | 9 • 6 | 1.91 | |
| | | 4-17 | 0.00 | 1000 1000 1000 | 1.90 | |
| | | 4-18 | | 1 0 0 0 0 0 | 1.90 | |
| | | 61-4 | | 1.87 | 1.89 | |
| | | 4-20 | 1.8 | 1.8 | 1.86 | |
| | | 4-21 | 1.8 | 1.8 | 1.84 | |
| | | 4-22 | 0 0 | 0 h | 1.80 | |
| | | | 00 | 00 | | |
| | | 4 × 5 | 00 | 00 | c / • 1 | |
| | | 4-54 | 1.7 | 1.7 | 1.73 | |
| | | 4-25 | , 0 | 1.70 | 1.71 | |
| | | 4-26 | | 1.6 | 1.68 | |
| | | 4-27 | 0100 | 9 9 6 | 1.67 | |
| | | 4-28 | 9 9 9 | 9 - 0 | 1.66 | |
| | | 62-7 | 1.6 | 300 | 1.66 | |
| | | 4-30 | 1.66 | 1.65 | 1.66 | |
| | | 5-01 | 1.6 | 1.6 | 1.64 | |
| | | 20-5 | (0100) | (1800) | 1.63 | |
| | | 5-03 | 9.10 | 9.0 | 1.62 | |
| | | 5-04 | 9 | 9. | 1.61 | i |
| | | | | | | |

00143c

1.93

(0100)

2-06

1.58 (0100)

(0100) 1.60 (0100)

2-02

DATE

| | | • | | | | | | | | |
|---|------------------|----------|---------|---------|----------|--------|--------|------|-------------|--|
| | DATE | MAX GH | MIN GH | MEAN | DATE | MAY A | | | | |
| | | (TIME) | (TIME) | GH | UATE | | | MEAN | | |
| | | . | | GH | | (IIME) | (TIME) | GH | | |
| | 3-20 | 1.73 | 1.73 | , | | | | - 00 | 00153 | |
| , | • • • • | (1300) | | 1.73 | | | | | | |
| | | (1300) | (1300) | | 2-06 | 1.62 | 1.62 | 1.62 | | |
| | 3-21 | 1.73 | | | | (1400) | (1400) | | • | |
| | 2-51 | | 1.72 | 1.73 | 2-07 | 1.62 | 1.62 | 1.62 | | |
| | 2-22 | (0100) | (1100) | | | (0100) | (0100) | | | |
| | 3-66 | 1.73 | 1.72 | 1.73 | 2-08 | | 1.62 | 1.62 | | |
| | | (0100) | (2100) | | | (0100) | (0100) | 1.05 | | |
| | 3-23 | 1.72 | 1.71 | 1.72 | 2-09 | | 1.62 | 1 63 | | |
| | | (0100) | (1700) | | | | (0100) | 1.62 | | |
| | 3-24 | 1.73 | 1.70 | 1.72 | 2-10 | 1.62 | 1 63 | | | |
| | | (1000) | | | - •• | (0100) | 1.05 | 1.62 | | |
| | 3-25 | 1.73 | 1.72 | 1.73 | | .01007 | (0100) | | | |
| | | (0500) | (0100) | | 2-11 | 1 43 | | | | |
| | | | | | ~ 11 | 1.62 | _1006 | 1.62 | | |
| | 3-26 | 1.72 | 1.72 | 1.72 | 2-12 | (0100) | | _ | | |
| | | (0100) | | | 2-12 | | 1.62 | 1.62 | | |
| | 3-27 | 1.72 | 1.71 | 1.72 | | (0100) | (0100) | | | |
| , | | (0100) | (2100) | | 2-13 | | 1.61 | 1.62 | | |
| | 3-28 | | 1.71 | 1.71 | • • • | (0100) | (1500) | | | |
| | | (2300) | (0100) | 1011 | 2-14 | 1.63 | 1.61 | 1.61 | | |
| | 3-29 | | 1.74 | 1.75 | | (5500) | (0100) | | | |
| | | | (0100) | | _ | | | | | |
| | 3-30 | | 1.75 | 1 76 | PERIOD | 1.63 | 1.61 | • | | |
| | | | (0100) | 1.75 | | | | | | |
| | 7-71 | | 1.75 | 1.76 | • | · | | | | |
| | • • • | (0300) | (0100) | 1.70 | | | | | | |
| | | . 55007 | .01007 | | | | | | - | |
| | 4-01 | 1.76 | 1.76 | 1.76 | | | | | | |
| | | (0100) | (0100) | 11.0 | | | | | | |
| - | 4-02 | | 1.76 | 1.77 | | | | | | |
| | | (2100) | (0100) | 1 • 1 1 | | | | | | |
| | 4-03 | | 1.78 | 1 70 | | | | | 1 | |
| | - 03 | (1200) | (0100) | 1.79 | | | | | (| |
| | 4-04 | 1.79 | 1.79 | 1 70 | | | | | 1 | |
| | | (0100) | 1017 | 1.79 | | | | | | |
| | 4-05 | 1.79 | 1.78 | 1 70 | | | | | ĺ | |
| | - 00 | (0100) | (0900) | 1.78 | | | | | | |
| | | .0100/ | . 07007 | | | | | | | |
| | 4-06 | 1.79 | 1 74 | 1 70 | | | | | | |
| | ~ ∪ t7 | (1100) | 1.76 | 1.78 | | • | | | 1 | |
| | 4-07 | | (2200) | , | | | | | | |
| | - -0/ | 1.78 | 1.76 | 1.77 | | | | | | |
| | A = A A | (2000) | (0100) | | | | | | | |
| | 4-08 | 1.81 | 1.78 | 1.80 | 1 | | | | | |
| | , | (1300) | (0100) | | | | | | | |
| | 4-09 | 1.82 | 1.80 | 1.81 | | | | | | |
| | | (1100) | (0500) | | | | | | | |
| | 4-10 | 1.82 | 1.82 | 1.82 | | | | | | |
| | | (0100) | (0100) | | | | | | | |
| | | | | | | | | | 1 | |
| | 4-11 | 1.87 | 1.82 | 1.83 | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | 1 | |

| ٠. | | | | | | Ę | | |
|----------|-------|--------|--------|---------|----------|---|--------|------|
| | DATE | MAX GH | MIN GH | MEAN | DATE | *** | | |
| • | | (TIME) | (TIME) | GH | UATE | • | | MEAN |
| i. | | | | | | (TIME) | (TIME) | GH |
| | 12-19 | 1.79 | 1.78 | 1.79 | | | | |
| • | | (1100) | (1000) | | 12 44 | (0100) | (0100) | |
| 1 | 12-20 | 1.79 | 1.79 | 1.79 | 12-09 | 1.81 | 1.81 | 1.81 |
| • | | (0100) | (0100) | - | | (0100) | (0100) | |
| | | | | | 12-10 | 1.81 | 1.79 | 1.80 |
| v. L | 12-21 | 1.79 | 1.79 | 1.79 | | (0100) | (1400) | |
| i | •• •• | (0100) | (0100) | • • • • | | | | |
| | 12-22 | 1.81 | 1.79 | 1.79 | 12-11 | 1.79 | 1.79 | 1.79 |
| • • | | (2300) | (0100) | ••• | | (0100) | (0100) | |
| | 12-23 | 1.83 | 1.81 | 1.82 | 12-12 | 1.79 | 1.79 | 1.79 |
| <u>.</u> | 12-53 | (2300) | (0100) | | | (0100) | (0100) | - |
| -) | 12-24 | | 1.84 | 1.91 | 12-13 | 1.79 | 1.79 | 1.79 |
| ٠ | 15-54 | (2200) | (0100) | | | (0100) | (0100) | ••, |
| | | (2200) | (0100) | | 12-14 | 1.79 | 1.79 | 1.79 |
| ٥ | FETOD | 1.97 | 1.78 | | | (0100) | (0100) | ••• |
| f ' | CKIOO | | 1010 | | 12-15 | 1.79 | 1.79 | 1.79 |
| ١. | | | | | | (0100) | (0100) | |
| | | | | | 12-16 | 1.79 | 1.79 | 1.79 |
| i | | | | | | (0100) | (0100) | 10/9 |
| , | | | | | 12-17 | 1.79 | 1.79 | 1.79 |
| | | | | | | (0100) | (0100) | 1019 |
| 1 | | • | | | 12-18 | - | 1.79 | 1.79 |
| 1 | | | | | | (0100) | (0100) | 10/9 |
| | | | | | 12-19 | | 1.78 | 1.79 |
| t | | | | | | (0100) | (1000) | 1019 |
| ٠. | | | | | PERIOD | 1 01 | | |
| | | _ | | | U.EW.100 | 1.81 | 1.58 | |

| DATE | MAx GH | MTA: CH | | DATE | MAY GH | MITS CH | | |
|-------|---------------------------------------|----------------|---------|--------|----------------|---------|------|--------|
| 0=16 | - | (TIME) | MEAN | 0415 | (TIME) | (TIME) | | |
| | · · · · · · · · · · · · · · · · · · · | (1146) | חני | | (1230) | CITMET | ĞĦ | |
| | | | | | (0100) | (0900) | | |
| 11-16 | 1.58 | 1.58 | 1.57 | 10-27 | | 1.65 | 1.66 | 000155 |
| | (1000) | (1000) | | | (0100) | (1500) | | |
| 11-17 | 1.58 | 1.58 | 1.58 | 10-28 | 1.65 | 1.65 | 1.65 | |
| | (0100) | (0100) | | | (0100) | (0100) | | |
| 11-14 | 1.58 | 1.56 | 1.58 | 10-29 | 1.65 | 1.65 | 1.65 | |
| | (0100) | (0100) | | | (0100) | (0100) | | |
| 11-19 | 1.59 | 1.58 | 1.59 | 10-30 | 1.67 | 1.66 | 1.66 | |
| | | (0100) | | | (1100) | (0100) | | |
| | 1.60 | 1.59 | 1.59 | 10-31 | 1.71 | 1.66 | 1.68 | |
| | (2400) | (0100) | | | (5500) | (0100) | | |
| 11.31 | | | | 11-01 | . 7. | . 70 | | |
| 11-21 | 1.72 | | 1.70 | | | 1.70 | 1.71 | |
| 11-22 | (2100) | _ | | | (0100) 1.70 | | . 70 | |
| 11-22 | 1.73 | 1.72 | 1.73 | 11-05 | | (0100) | 1.70 | |
| 11-23 | | (0100) | , | 11-03 | 1.70 | | 1 70 | |
| | (0100) | 1.74 (0100) | 1.74 | | | (1400) | 1.70 | |
| | | | 1.74 | | 1.69 | | 1.69 | |
| ••• | | (0100) | 1 . / 4 | | | (1400) | 1.09 | |
| 11-25 | 1.78 | 1.74 | 1.74 | | 1.68 | | 1.66 | |
| | (5500) | (0100) | 1010 | | (0100) | | 1100 | |
| | | | | | | | | |
| 11-26 | 1.78 | 1.78 | 1.78 | 11-06 | | 1.63 | 1.64 | |
| | (0100) | (0100) | | | | (1000) | | |
| 11-27 | 1.80 | 1.78 | 1.79 | 11-07 | 1.63 | 1.61 | 1.62 | |
| | | (0100) | | | (0100) | | | |
| 11-28 | | 1.80 | 1.81 | 11-08 | 1.61 | 1.60 | 1.61 | |
| | (1100) | (0100) | | 11-00 | (0100) | (1400) | | |
| 11-29 | 1.81 | 1.81 | 1.81 | 11-09 | (0)00) | 1.50 | 1.60 | |
| 11-20 | (0100) | (0100) | | 11-10 | 1 61 | 1 60 | 1 61 | |
| 11-50 | | | 1.81 | 44 40 | (0200) | (0100) | 1.61 | |
| | (0)00) | (0100) | | | (0) 00, | (0100) | | |
| 12-01 | 1.41 | 1.81 | 1 91 | 11-11 | 1.61 | 1.61 | 1.61 | |
| | (0100) | (0100) | 1.01 | | (0100) | (0100) | | |
| 12-02 | | 1.81 | 1.81 | | 1.61 | 1.59 | 1.60 | |
| | (0100) | (0100) | •••• | | | (1700) | _ | |
| 12-03 | 1.81 | 1.81 | 1.81 | 11-13 | 1.59 | 1.58 | 1.58 | |
| | (0100) | (0100) | | | (0100) | (0900) | | |
| 12-04 | 1.81 | 1.81 | 1.81 | 11-14 | | 1.58 | 1.58 | |
| | (0100) | (0100) | | | (0100) | (0100) | _ | |
| 12-05 | | -1.81 | 1.81 | 11-15 | | 1.57 | 1.57 | |
| | (0100) | (0100) | | | (0100) | (0500) | | |
| 13 44 | | | | 11-14 | 1.57 | 1.57 | 1 57 | |
| 12-05 | 1.81 | 1.81 | 1.81 | 11-10 | (0100) | (0100) | 1.57 | |
| 12-47 | (0100) | (0100) | 1 01 | | .01001 | .0100, | | |
| 12-07 | 1.81 | 1.81 | 1.81 | PEPIOD | 1.74 | 1.57 | | |
| 12-09 | 1.81 | (0100) | 1 01 | | • • • | | | |
| 16-03 | 1 • C 1 | 1.81 | 1.81 | | | | | |

| 10-25 | 70101 | | 10-24 | 10-23 | 22-01 | • | 10-21 | | 0-20 | t [-0 [| 1-01 | • | 10-17 | 10-16 | • |)) | 10-14 | 10-13 | 10-12 | | • | 0-10 | 0-09 | 10-09 | 10-07 | 10-06 | | 10-05 | 10-04 | . ! |
|-------|--------|--------|-------|-------|--------|--------|-------|--------|------|---------|--------|--------|-------|------------|--------|--------|-------|-------|------------|--------|--------|--------|------|---------|-------|--------|-------|-------|--------|------------|
| 1.67 | (0010) | (0000) | 1.67 | 1.70 | (0A00) | (0100) | 1 | (0100) | 1.71 | 1.71 | (1000) | (1=00) | 1.67 | N p 3 0 | (0100) | (0040) | 1.61 | | 1.63 | (0)00) | (0100) | (0100) | 1.67 | (0) 00) | ~ | (0100) | | 1007 | (0051) | (T I M H) |
| 1.66 | (0100) | 00 | 1.67 |) (| (0100) | 00 | 1.6 | (2200) | • 0 | 1.49 | 0.0 | 00 | 1.45 | • • | (0100) | 000 | 1 6 | 100 | 200 201 | 1.63 | 0 | D 0 | 1.6 | N | 1.6 | (1400) | | | 00 | (3×11) |
| 1.66 | • | | 1.67 | 1.68 | 1.04 | | 1.68 | | 1.71 | 1.71 | • 00 | • | 1.66 | 1.64 | | 6 | 1.61 | 1.60 | 1.62 | 1.64 | | 1.66 | 1.67 | 1.68 | 1.69 | 1.71 | | 1.74 | 1.74 | φ (1 |
| | | | | | | | | | | | | | | | | | | | | | | | | 001834 | 10-04 | | 10101 | 10-02 | 10-01 | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.74 | 0 • | 0 • | 0 | 1.74 |)) | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.54 | 0 ~ | 10. | 70 | 1.74 | | • |
| | | | | | | | | | | | | | | | | | | | | | | | | | • | | 1.74 | 1.74 | 1.68 | 6 |

--

(

A from the t

| dentification Trop James was asen | | | | 0.000 | | - | #7. VADI ALEP 48:404 | | | .~ | a-3 00/0-a ter 111 0a 15 | | | | .roum | 5-4 t e * | .~~ | 7015 | | - | | | ~ | | -rand (P* |
|--|--|---|--|--|--|--|---|--|---|--|--|---|---|--|---|--|--|--|---|--|------------|--|---|--|--|
| | *10 6 | | | - 63- | - | F 19 | 65 er | | 63- 60 | 1.19 | | 5/1 9/2 5/1 | | | 4 2 | | 4 () | * 3. 5/17 | * 23 | | | 25 6 | | 5 25 | |
| | | | i | | 1 | ! | | 1 | | | | | | | | 1 | ı. | | | | | | | x I | |
| • | 1 | , , | • 79 | 77 | 4 1 | | | oj 6.3 | • • • • | •> | 6.1 4 | 40 i 40 | | ••• | 7.9 7 | 1 75 | 77 | 76 7.0 | | • • | • | 69 (| , | ias | |
| COPE MANAGE ! | 1:05 E | 107 ED | M 1986 | 1 1900 | | 769 6 | UP 201 | | (See 6034 | ; :190::1 | MOS 190 | ; 27 : 166 | | 1 | | M2 9/76 i | | (7/7 5 00 | | 174 KO74 | | *** | 72 144 | | 904 4 00 |
|) —) sar. | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | |
| ar contour | - 1 | 7 | NT | , | * | <i>-</i> | 30 47 | - | CS 76 | iMT | 4 11 | NT | - | : | | 20 470I | l nt | 19 12 | NT | 13 4 | i | wT (| 4 3 | N- | 21 |
| | NT 1 | | l | | MT | l | NT NT | MT | | i | NT NT | į. | | ∾T | | * NT | ! | NT NT | ' NT | NT NT | - 1 | | NT NT | 1 | N F 1 |
| DIGLES, mark. | 2 017 0 | - | 1 Care | 007 | 0081 | 0000 | 2098 001 | MH 0004 | 966 976 | 0007 | 00 100 | MASI GOL | 13 OOH | 100001 | 9005 M T | ** | 0.006 | 0 105 000 | 1 0400 | 00000 | | | C10 0084 | 0007 | 0000 |
| and any t | 9 1 | 9 5 91 | 190 | 40 | ₩ | 170 1 | 470 | 220 | 440 360 | 99 | " | 2 × | 0 229 | ™ | HIO 674 | o erro | 78 | 160 TE | 100 | 61 % | • | 20 9 | 9 0 60 | 47 | 77 (|
| S SPEAKE, my/L | - | - , | ١. | 1 | ' | | o 4 4 | 4 | • • | 1 | | | • | 2 | IOI 122 | *** | - | 216 - | ١. | - 1 | į | 1 | | • | 1 |
| EDM. mys. | | | - | - | - | - | | - | | ! - | | - } - | - | - | | - | - | | - | | . | - | | | |
| MONE, may to | - | // | 0 / 1.6 | ; | 110 | - 4 | 60 ur | - | | - | | ; - | - | - H | <i>u</i> .6 | D 209 | ۱ - ، | 40.44 | - | 2 | : | - | 290 | | |
| LD4. mgA | _ | - 34 | 0 1.1 | | معه | | | يمر أ | - 64 | Ì _ | | · . | _ | | E 4 % | , 2 20 | | M -23 | | 54 | أص | | 110 | 1 - | _ |
| 1 | | -47 | i | 1004 . | | ! | | i i | mid. | | | j | | Ī | | |] | | | _ | _ | | | | wy. |
| 8°1, | - | | 1-2 | <i>,</i> | — | - | | . | AND - | - | | | - | - | 46 | بالم <i>ه</i> د. او | 0 | 105 - | | <i>1</i> | - | • | | 4 | (M.) |
| | | | | | , | ! | | | | | | Í | | ! | | | | | 1 | | : | | | : | |
| 10. mg/L | _ | | : - | - | _ | - | | - - | | - | - . | - | - | - i | - 0 | OD 003 | - | | - | - | - ! | - | | <u>-</u> | - |
| PER, my/L | - 4 | 901 001 | - | - | - | - | | - - | | ea | - ac | 72 - | - | ادعه | - 0 | OI 0.01 | - | - 001 | · - | - | - | - | | · - | ع بصد |
| a | - | | ; - | - | - | - | | - - | | - | . . | - - | - | - | - (| | - | | - | - | - | - | | - | - |
| OMAN, 1000 . 10074 | | | | _ | _ | | - 00 | | | _ | _ | _ _ | _ | _ | - 0 | .OR 002 | ١. | | _ | | - | | | | _ |
| DAG, 122 | Į | | i | | | | _ | | | | | 1 | | į | | | ĺ | | i | | | | | i | |
| /\ | - | | ! - | • | - | - | - 41 | r - | | - | | - - | - | - | - | | - | • • | - | - | - | - | | ; <u>-</u> ! | - |
| E. apri | _ a | 103 - | i - | 901 | - | - 6 | 008 ~ | - | | - | | - - | - | - | 02 0 | 44 0.1 | - | | j - | - | - | - | | - | - |
| 1000 , 10 /6 | - | | - | - | - } | - | | - | • • | - | • | - - | - | - | | 1 | - | | - | - | - | - | | - | - |
| N. 1880, 1889. | 134 | 204 15 | 55 | . ,, | 46 | 42 | 76 6 | 190 | 39 94 | 2.0 | 67 76 | 07 | . 08 | 10 | 164 7 | 7.9 26 1 | 271 2 | A.> 63 P | 17 | 3 3 13 | • | 19 9 | 50 BB | 01 | 01 |
| | a es | 100 04 | ,, 09 | 030 | 239 | 0 96 | 100 101 | 0 00 | 016 06 | 020 | 97 09 | m 0% | 9 070 | 200 | 3 TP 2 | 4 446 | 294 | D 115 | 041 | 10 1.4 | • | o (| 0 99 2 00 | 00 | o.# |
| 10017, m/L | - | - | - - | - | - | - | . . | - - | | - | - | - - | - | - | - | | - | | - | - | - | - | | - | - |
| | 2.308.4 | 2005 000 | | 0000 | rora | | 00H 00H | | | i Icon | 000 | | | | | 4 00/4 | | | | ~~· ~ | ~ İ | wrs 0 | AL 0000 | | ~~~ |
| i | | | | | | | | 1 | | i | | | | | | | | | | | - 1 | | | | - |
| £HINM, ma ∕l | - (| GE 1 - | · icoo | i occi | • | | COD 0000 | • - | 5006 GE! | - | - | - 1000 | N O CRECI | - ' | 0004 000 | II CODE | | - 200t | - | • • | - ! | - | - (00) | · - | |
| MUM . =4/L | - | | - | - | - | - | | - | | - | **** | | - | - | | - | 03 | C2 04 | - | - | - ' | - с | 3 03 | - | |
| /(Di. eq / L | 003 | cor - | . - | - | - | - | | - | | - | | - , - | - | - | - co | , - | <u> </u> | oo - | - | - | | - | | | cor - |
| i | | - | | | | 1 | | 1 | | | | | | | | | | | | | | | | | |
| | | NT 10 | | TNT | >4 | NT | NT 194 | MT | HT STAS | NT | NT K | 0≱¦ ⊌T | NT | icet · | אר אז | 3406 | l I NT I | NT 1517 | - | NT 64 | | NT N | NT 994 | I HT N | N- 46 |
| 1.06 , m/ i 1. 34 77000 | NT. | איד פ | | | 946 | HT. | | | HT 876 | 1 | | | NT. | | | | | | -,- | - | м : т : | | | HT | |
| 1005 , mo/L NL 50070000 UGS , mp/L | | איד פ | - • | 7 1/7 0 | 144 15 20 | NT . | 40 127 | >1 | HT 87% | NT 97 | N- N | 04 WT | | | N™ NT 30 64 99 121 | . ,- | 62 | NT 1517 47 NT 480 548 | 3 | ю н | | | нт эзл 9 нт 47 | 2 | NT 46 5 N 425 IB |
| LIGS , mo/L NL SUPPORTS LIGS , mp/L LIGSTE , mg/L | ₩7 69 | ит ра 600 и 600 ян | - 6 12 | • • | 15 20 | 20 | 46 I.F 71 30 | 54 160 | 60 73 | 37 78 | N" N | 98 34 | 26 | 5.5 | 49 121 | . ,- 3 +5 | 62 340 | 47 HT 4 7 0 348 | | ю н | • ' | 3 - | | 2 HED 1 | 5 N |
| LIGE, mark in Supremises LIGE, mark LIGEE, mark | 4" 69 - | ит га всо и всо ян | - 6 - 00 | | \$ 10 B | 6 4 20 1 | 46 17 71 30 044 048 | 31 160 3 076 | 60 73 094 097 | 70 | N " N 190 19 | 98 34 | 26 | 22 22 | 50 64 99 121 068 C | , ,- 3 as 96 C95 | 62 6 340 6 | 47 MT 4 4 0 348 | | 196 H | • ' | 3 · | 9 HT - 47 | 2 H4D I | 5 4 1425 16 - c |
| LIGS, mark h, suprement LIGS, mark LIGS, mark LIGSTON EMPORUS, mark KALBETT, mark | NT | ит ра 600 и 600 ян | - 6 - 00 | • • | \$ 10 B | 80 ° | 46 177 71 30 044 044 070 698 | 51 160 5 076 | 60 73 | 70 | N" N | 98 34 08 12 80 NT | 20 | 22 0 60 11= 1 | 49 121 0 84 C 1800 K | 5 45 96 C95 010 1010 | 62 · 940 · 003 | 47 MT 490 348 650 MT | - | 196 115 | | 3 - 76 - - · | 9 HT - 47 | 2 HED I | 5 4 425 (2 - c |
| LIGS, mark h, suprement LIGS, mark LIGS, mark LIGSTON EMPORUS, mark KALBETT, mark | NT | ит га всо и всо ян | - 00 | | 20 00 00 00 00 00 00 00 00 00 00 00 00 0 | 80 ° | 46 17 71 30 044 048 | 51 160 5 076 | 60 73 094 097 | 917 740 - | N " N 190 19 | 98 34 08 12 10 NT | 20 | 22 0 60 11= 1 | 49 121 0 84 C 1800 K | , ,- 3 as 96 C95 | 62 · 940 · 003 | 47 MT 4 4 0 348 | - | 196 115 | 5 | 76 - | 9 HT 47 | NT OZ C | 5 N H25 R - 0 |
| LUSS, mark is suprement LUSS, mark JATE, mark Emiddles, mark Emiddles, mark Emiddles, mark Emiddles, mark | 410 01 | ит в всо и ко эм | - 00 | 10 16 16 16 16 17 10 | 27 20 0 B 660 | 0 4 20 5 027 6 MT 8 | 46 177 71 30 044 044 070 698 | 91 180 076 076 | 60 73 94 977 1210 HO | 97 70 - HT 02 | NT N 200 19 - 20 710 53 | 98 34 08 12 80 NT | 26 1 18 1 970 | 440 252 114 | 99 121 0 64 C 1900 16 | 5 45 96 C95 010 1010 | 62 - 540 - 005 960 | 47 MT 490 348 650 MT | 1 75 - 140 | 10 N 136 115 | 5 | 76 - | 9 HT - 47 | NT OZ C | 5 N H25 H3 - 0 H0 H2 |
| LUGS, mark is supposition LUGS, mark LUGS, mark LUGS, mark EMORIS, | 410 01 | NT 60 N 100 94 1 - 0 19 11 | - 00 - 00 - 00 - 00 - 00 | 10 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16 | 17 20 0 E | 0 4 20 5 6 7 6 7 6 | 46 1/7 71 3/0 044 044 0750 644 | 34 025 026 NT 04 | 150 73 934 937 12101110 | 97 78 - HT 02 678 | N" N 200 19 - 20 710 53 | 98 34 98 12 90 NT | 20 1 15 1 970 1 01 | 22 | 30 84 99 121 044 0 1800 14 01 0 | 3 45 96 099 96 000 01 02 | 62 6 340 6 003 460 | 47 MT 470 368 950 MT - 0.1 | 195 | 10 N 1986 115 T T T T T T T T T T T T T T T T T T | | 3 - 76 - 7 276 4 02 | 9 HT 47 | NT I OZ C | 5 N H25 H2 - 0 - 0 - 0 |
| LUSS, mark LUSS, mark LUSS, mark JATE, mark JATE, mark MALESTY, mark METEORITY, mark | AT | NT 69 600 N 600 94 1 17 2 19 11 | - 60 - 00 - 00 - 00 - 00 - 00 - 00 - 00 | 10 HT 12 12 | 5 20 08 04 14 197 | G27 C | 40 1/2 71 30 044 044 070 844 0.1 | 31 160 078 078 04 190 | 180 73 094 097 1210 1110 01 01 180 210 | 97 78 - HT 02 076 75 | NT N 200 19 - 30 710 53 01 01 C90 12 | 98 34 35 12 10 NT 1 G1 4 G1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 20 1 15 1 970 1 01 | 22 0 80 0 80 0 80 | 30 64 99 12 046 C 1800 19 01 0 250 9 | 3 45 96 099 96 000 01 02 | 940 | 47 NT 450 368 450 NT - 0.1 | 195 | 10 N 136 H3 H3 136 H3 136 H3 136 H3 136 H3 136 H3 136 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 | | 76 7 76 7 76 4 02 04 | 9 HT 47 | 2 H4D k | 5 N 1425 H 1 0 14 0 1 0 |
| LUSS, mark LUSS, mark JATE, mark SENSORUS, mark LAMBETY, mark METE-SETTETS, mark METE-SETTETS, mark METE-SETTETS, mark METE-SETTETS, mark ASSESSED MARKETY ASSESSED | 410 01 16 | NT 60 N N N N N N N N N N N N N N N N N N | - 60 mm | 10 14 12 14 14 14 14 14 14 14 14 14 14 14 14 14 | 17 20 0 8 660 0.1 16 1977 3-40 | G27 C | 40 1/71 300 044 085 070 875 - 0.1 40 148 | 91 1820 0 78 0 194 194 194 42 | 100 73 094 097 12101110 01 01 80 210 | 577 76 | NT N S20 19 - 20 710 53 01 01 01 01 01 12 136 12 | 98 34 12 100 NT 1 G1 G1 G1 G1 G1 G1 G1 G1 G1 G1 G1 G1 G | 20 15 15 17 970 16 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0. | 22 940 1 580 | 30 84 99 121 0 84 0 14 0 14 0 14 0 14 0 14 0 14 14 14 14 14 14 14 14 14 14 14 14 14 | 3 45 96 C95 96 000 01 02 90 450 | 940 005 940 005 940 005 | 47 MT 460 368 0.1 C/E 0.69 76 206 76 26 | 175 140 035 028 | 10 N 136 H3 H3 136 H3 136 H3 136 H3 136 H3 136 H3 136 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 H3 | | 76 - · · · · · · · · · · · · · · · · · · | 9 MT - 47 | 2 MED II NT 102 0 | 5 N 1425 H |
| LUGS, mark LUGS, mark LUGS, mark LUGS, mark EMPORIS, mark EMPORIS, mark EMPORIS, mark EMPORIS, mark EMPORIS, mark EMPORIS, mark EMPORIS, mark EMPORIS, mark ASSESS of Mark ASSESS | 410 01 16 62 77 | NT 80 N N 100 94 NT 20 NT 20 NT 95 NT 95 SM 341 | - 60 to 120 to 1 | 10 14 12 17 12 14 1 | 157 20 08 660 01 16 197 29 | 0 4 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 | 40 1/7 30 644 044 044 044 044 044 044 044 044 04 | 94 078 078 076 04 040 199 42 | 60 73 034 097 12101HO 01 04 80 200 48 292 53 96 | 97 78 - HT 0.2 076 78 10.2 | N" N 900 19 - 20 910 53 01 01 030 12 198 198 199 193 | 0 0 12 0 NT 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 20 20 1 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 22 Q 60 940 1 8 8 16 | 30 64 99 121 0 64 0 10 10 10 10 10 10 10 10 10 10 10 10 1 | 3 45 36 C 93 96 C 93 96 000 97 987 90 430 77 987 | 62 4 540 0 005 940 02 | 47 MT 480 348 480 MT 480 MT CVE Q49 76 205 76 26 | 1 95 140 03 031 114 | 10 N 196 119 200 27 0 0 40 0 60 21 76 71 | | 3 - 76 - 7 - 76 - 7 02 - 66 - 6 | 9 MT - 47 | 2 NT 102 0 | 3 N N N N N N N N N N N N N N N N N N N |
| LUSS, mark In Subminish LUSS, mark JATE, mark EMMORIES, mark EMMORIES, mark EMMORIES, mark METE-STRITE, mark MORE-STRITE, 610 01 16 82 77 | NT 60 N N 100 94 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | - 60 mm | 10 16 16 17 17 17 17 17 17 17 17 17 17 17 17 17 | 10 0 0 0 0 0 1 0 0 1 0 0 1 1 0 0 1 | 6 4 20 1 22 1 22 1 22 1 29 44 | 46 1/2" 71 30 044 046 070 846 0.1 820 146 873 873 56 140 77 172 | 91 VSD 0786 0786 0786 0786 0786 0786 0786 0786 | 80 79 994 997 1210 1110 01 04 80 280 48 292 59 96 76 107 | 97 78 - IIT 02 079 75 IG2 77 | N" N 900 19 - 30 910 93 01 01 09 12 198 198 199 193 199 193 | 98 34 12 100 NT 1 G1 64 65 12 17 62 | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | 22 0 60 1 0 60 1 16 94 | 99 121 0 94 C 1800 19 0 1 C 25 C 9 909 5 199 4 | 96 C99 96 C99 96 C99 97 02 90 430 77 997 10 69 | 62 - 340 - 3 | 47 MT 460 368 950 MT - 0.1 CVE 049 76 208 76 99 | 039 029 114 40 | 10 N 196 115 200 27 0 0 40 0 6 116 60 21 79 71 41 46 | | 3 / 76 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | 9 NT - 47 | 2 M6D II NT O2 C O4 O4 O4 O4 O4 O4 O4 | 3 N N N N N N N N N N N N N N N N N N N |
| LUSS, may's IN SUBSTREET IN | NT 299 410 01 16 487 77 296 | NT 60 94 11 11 11 11 11 11 11 11 11 11 11 11 11 | - 60 est | 10 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | 10 08 660 01 16 157 398 157 159 160 160 160 160 160 160 160 160 160 160 | 0 4 50 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 60 1/2" 71 300 064 0 064 070 846 0.1 80 146 170 772 10 772 10 772 | 54 078 078 078 040 198 42 164 64 | 180 79 097 12/01/10 01 01 01 180 280 580 76 107 109 590 590 590 | 97 78 107 02 076 78 102 77 26 | N" N 900 19 - 30 910 53 GI OI 090 12 198 131 144 127 59 94 560 860 | 98 34 12 10 NT 1 | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | 22 0 69 1 6 0 1 16 20 20 230 | 99 121 0 68 C 1800 19 0 1 29 0 9 19 9 19 6 19 7 | 3 55 96 C95 96 C95 90 600 01 02 90 450 77 957 10 68 70 471 | 62 | 47 MT 460 368 950 MT - 0.1 CVE 0.69 76 205 76 95 760 950 | 1 75 140 0.5 0.7 144 40 240 | 10 N 196 HI 196 HI 196 O | | 3 - 76 - 76 - 776 - 4 0 2 C642 G 44 - 17 - 60 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 9 HT 47 47 460 600 600 600 600 600 600 600 600 600 | 2 H4D H | 5 N N N N N N N N N N N N N N N N N N N |
| LUGS, mark suprements LUGS, mark suprements LUGS, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark suprements, mark | NT 299 410 01 16 487 77 296 | NT 60 94 11 11 11 11 11 11 11 11 11 11 11 11 11 | - 60 est | 10 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | 10 08 660 01 16 157 39 16 157 16 157 16 157 | 0 4 50 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 46 1/2" 71 30 044 046 070 846 0.1 820 146 873 873 56 140 77 172 | 54 078 078 078 040 198 42 164 64 | 80 79 994 997 1210 1110 01 04 80 280 48 292 59 96 76 107 | 97 78 107 02 076 78 102 77 26 | N" N 900 19 - 30 910 53 GI OI 090 12 198 131 144 127 59 94 560 860 | 98 34 12 10 NT 1 | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | 22 0 69 1 6 0 1 16 20 20 230 | 99 121 0 68 C 1800 19 0 1 29 0 9 19 9 19 6 19 7 | 3 55 96 C95 96 C95 90 600 01 02 90 450 77 957 10 68 70 471 | 62 | 47 MT 460 368 950 MT - 0.1 CVE 0.69 76 205 76 95 760 950 | 1 75 140 0.5 0.7 144 40 240 | 10 N 196 HI 196 HI 196 O | | 3 - 76 - 76 - 776 - 4 0 2 C642 G 44 - 17 - 60 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 9 NT - 47 | 2 H4D H | 5 N 1425 Hi 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| LUGS, mark IL SUBSTITUTE LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark LUGS, mark | NT 299 410 01 16 487 77 296 | NT 60 94 11 11 11 11 11 11 11 11 11 11 11 11 11 | - 60 mm | 10 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | 10 0 B 6600 Cu 16 1977 198 1990 1990 1990 1990 1990 1990 1990 | 0 27 C 027 C | 40 1/2 71 50 044 044 044 044 044 044 044 044 044 | 91 480 076 040 1940 42 144 64 NT | 180 79 097 12/01/10 01 01 01 180 280 580 76 107 109 590 590 590 | 97 76 - MT G2 C76 1G2 77 26 NT | N" N 900 19 00 910 93 01 01 09 12 198 12 198 127 33 94 900 840 | 98 34 12 10 NT 1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | 22 0.60 1 6.50 1 16 56 1 16 56 1 16 16 16 16 16 16 16 16 16 16 16 16 | 30 64 99 121 0 001 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 | 3 25 36 C93 36 C93 36 C93 36 690 37 987 30 69 370 69 370 66 600 600 | 62 - 62 - 62 - 62 - 62 - 62 - 62 - 62 - | 47 MT 480 368 490 MT - 0.1 CVE 0.89 75 208 75 160 75 160 76 99 760 680 | 1 75 140 0.5 0.7 144 40 240 | 10 N 196 HI 196 HI 196 O | | 3 - 76 - 76 - 776 - 4 0 2 C642 G 44 - 17 - 60 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 9 HT 47 47 460 600 600 600 600 600 600 600 600 600 | 2 H400 h | 5 N 12 |
| LUSS, mark ILLES, mark LUSS, mark LUSS, mark EMEGRATY, mark METE-STRINE, mark METE-STRINE, mark MORE-STRINE MORE | NT 59 6 610 01 16 62 777 299 644 11000 7700 7700 | NT 60 94 11 11 11 11 11 11 11 11 11 11 11 11 11 | - 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | 00 - 00 HT - 0 | 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 27 C | 60 1177 771 500 0444 0444 0444 0444 0444 0444 0444 | 31 150 036 0 170 0 | 180 79 097 1230 1110 01 01 01 01 01 01 01 01 01 01 01 | 102 C76 75 IGS 77 1610 IGS 161 | NT N N 1900 15 1900 12 1900 12 1900 12 1900 12 1900 12 1900 1800 1000 1000 1000 1000 1000 1000 | 99 34 34 35 36 37 37 38 38 39 39 39 39 39 39 39 39 39 39 39 39 39 | 20 20 21 29 21 21 21 21 21 21 21 21 21 21 21 21 21 | 22 Cent 60 16 54 16 20 20 20 20 | 30 84 99 121 99 | 3 25 36 C93 36 C93 36 C93 36 690 37 987 30 69 370 69 370 66 600 600 | 62 - 62 - 62 - 62 - 62 - 62 - 62 - 62 - | 477 MT 480 368 950 MT - 0.1 CVE 0.89 76 265 76 95 760 950 | 0.9 0.7 0.7 11.4 4.0 24 240 1.343 | 10 N 196 HI 196 HI 196 O | | 3 - 10 - 17 - 10 - 17 - 10 - 17 - 10 - 17 - 17 | 9 HT 47 47 400 800 400 600 600 600 600 600 600 600 600 6 | 2 Map s Ma | 5 N 12 |
| NAME , mark SEPTIMENT , mark SEPTIMENT , mark SERVICE , mark SERVICE , mark SERVICE , mark SERVICE , mark SERVICE , mark SERVICE , mark SERVICE , mark SERVICE , mark | NT 59 6 610 01 16 62 777 299 644 11000 7700 7700 | NT 66 N N N N N N N N N N N N N N N N N | - 6 6 6 7 7 1.4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 00 - 00 HT - 0 | 10 08 640 04 16 1977 1977 1980 — CI | 0 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 60 1177 771 500 0444 0444 0444 0444 0444 0444 0444 | 31 M20 038 30 MT 04 MT 04 MT 04 MT 04 MT 1790 | 180 79 097 094 097 1230 1810 004 020 1820 1820 1820 1820 1820 1820 1820 | 102 77 100 100 100 100 100 100 100 100 100 | NT N N 1900 15 1900 12 1900 12 1900 12 1900 12 1900 12 1900 1800 1000 1000 1000 1000 1000 1000 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | 22 Q 60 1 4 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 0 | 30 64 99 121 004 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 | 3 55 36 C 93 36 C 93 36 C 93 37 937 30 68 370 68 370 66 370 66 370 66 370 66 370 66 370 66 370 670 | 62 62 63 64 64 64 64 64 64 64 64 64 64 64 64 64 | 477 MT 480 368 950 MT - 0.1 CVE 0.69 75 205 75 460 775 460 040 06 | 0.5 0.5 0.5 11.4 40 240 1.563 | 10 H 135 H 135 H 136 H 1 | | 3 - 76 - 7 - 776 - 4 0 2 Cest 0 4 - 77 - 60 1 5 3 - 7 - 7 5 4 1 - 7 5 5 6 7 - 7 5 6 | 9 HT 47 47 47 400 6000 0.01 11 11 11 11 11 11 11 11 11 11 11 11 1 | 2 Map s Ma | 5 N M2 |
| Down mg/L TASSEN mg/L LCIUM mg/L LCIUM mg/L | NT 59 6 610 01 16 62 777 299 644 11000 7700 7700 | NT 60 N N 100 SM NT 2 NT 2 NT 2 NT 2 NT 2 NT 10 | - 6.00 1990 100 100 100 100 100 100 100 100 | 00 - 00 HT - 01 | 10 0 8 660 04 16 197 946 197 1960 — C1 200 | 0 / 20 / 20 / 20 / 20 / 20 / 20 / 20 / | 60 1/7 71 50 044 044 044 044 044 044 044 044 044 | 31 M20 038 30 MT 04 MT 04 MT 04 MT 04 MT 1790 | 180 79 097 094 097 1230 1810 004 020 1820 1820 1820 1820 1820 1820 1820 | 97 78 | N" N 900 19 - 30 910 93 01 01 09 12 198 131 144 127 39 94 300 840 000 100 001 00 004 03 150 190 | 005 12 00 NT 1 01 00 NT 1 01 00 NT 1 01 00 NT 1 01 00 NT 1 01 00 NT 1 | 20 20 20 20 20 20 20 20 20 20 20 20 20 2 | 22 Q 24 1 4 940 1 4 94 | 30 64 79 121 004 0 10 10 10 10 10 10 10 10 10 10 10 10 1 | 3 | 91 910 91 91 91 91 91 91 91 | 477 MT 480 368 950 MT - 0.1 CVE 0.69 75 205 75 460 775 460 040 06 | 195 039 184 184 124 124 124 124 124 124 124 124 124 12 | 10 N 11 135 115 115 115 115 115 115 115 115 | | 3 - 76 - 776 | 9 HT - 47 | 2 HAD N 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 5 N M2 |

- 11 ALL ANALYSES PERFORMED BY ILLINOIS EPA

2) — (HYPHEN) NOIGHTES NONE DETECTED
3) NT (NOIGHTES NOT TESTED

TABLE 5- RESULTS OF ANALYSES ON GROUNDWATER

| ample identification ample from tath Semire was foom | | | | riens | - | #-1 *414#4 | 24 | 41111 | | a-S 111mpts | | | 7 | | | ard Trapis | | and 11 inpts | | 2-10 11-00-12 | | |
|--|--------------------------------------|----------------|-------------|-------------------|-----------------------|---------------|-------------|-----------------|-----------|-----------------|----------|----------------|-----------|----------------|------------------|-----------------|----------------|-----------------|---------|-----------------------|---------------|-----------------|
| | - 140 ex | - 407 | | 62 M7 | 7 | ** | | | | ** | 71 P'S | 65-61 | 1 5 D- 6 | ₩ ₩17 | ** | *** | 77 1.3 | | 71 1 m- | 42-41 | | :: |
| PARAMETERS | | | | | | | | | | | | | | | | | • | | i | | | |
| ** | •• •• | • | ** | " | | 64 A | . AT | • • • | > 47 | &1 4 | 1 10 | 47 44 | | 71 79 | , 77 | 78 75 | 67 | •• •• | • | •• •• | •• | •1 |
| District Annual | 100) CE | - | 1988 19 | 100 mm | ~~ | ••• 12 | 1 1000 | - | - | 400 101 | r j last | | i 2000 4 | ** | 1 | COTO 400 | 105 | -P 0P | 749 | 1777 1664 | HT 1 | |
| *** - 1 EE, | - • | 7 | HT 9 | , , | - | 30 17 | į - | ~ ~ | uT. | 4 11 | - | # X | 47 2 | 280 47C | MT | 19 12 | MT | • • | ur | (4) | 47 | 2: |
| COLUMN COLUMN | HT MT | ≈ T | ur u | r w | ٠, | WT WT | 47 | NT NT | wT | KT HT | MT | NT NT | NT . | NT NT | ut | NT NT | 107 | MT NT | - | WT NT | wit | MT |
| - | 0.007 0.00 | - | a 1850 a | | 0.000 | 40E 40 | - | - | 1 300 | - | eļ car | - | - | PP 448 | 0.000 | - | | 444 444 | - | | • | |
| - CHÉMINE, ESPEIR BÉRNIS, AND | . 91 94 | | - | | *** | | - | | | | 230 | 200 (%) | | es erre | 78 | HO 76 | - | ** | 20 | 70 40 | | 77 |
| -0. 1 4704 | | • | ļ., | 1 | | | 1. | • • | | | 1 . | . 1 | 100 10 | 2 ••• | - | 216 - |]. | - 1 | 1. | | ۱. | 1 |
| - MINERAL 1994 | | - | | | - | | - | | - | | 1 - | | | | | | - | | - | | · - | - |
| " The State of the | · | -00000 | | - 2000 | - a | - | - | | - | | 1 - | | | | | - | - | - 4 | | | - | - 00 |
| ' LTUDE MA | | _ | 1.00m | | ! - | | _ | ~ | 1 - | | | | - | | | | | | | | | _ |
| | | | | | ! - | | | | • | | • | | | | | | Ι. | | | - 464 | | |
| _ PCB'S mp/L | · • | - | | -4 | - | | - 4 | | - | | : - | | | | , . . | - | | | - | | ļ - - | |
| | | | | | i | | | | 1 | | 1 | | | | | | † ; | | Ì | | 1 | |
| LEAS, 497L | ; | - | | · - | - | | - | | - | | - | | - | w | - | | - | | - | | - | - |
| - COPPER MAY | - 00 | Ogs | · | · - | - | | - | | | - 001 | • - | - 403 | · - · | 0 0 0 0 0 T | - | - 00 | - | | - | | - | 2 01 0 |
| | ; | - | | | - | | - | | - | | - | | ! - | a 1 04 | - | | - | | - | | ; - | - |
| | | - | | | _ | - 00 | - | | - | | - | | | - | - | | - | | - | | - | - |
| | | | | | | _ | j | | | | | | | | | | | | | | | |
| 4/1 | | - | | | <u>-</u> ا | - 47 | | | - | | | | 92 6 | 241 04 | i - l - | • • | | • • | | | | • |
| int, myrk | - | - | 00 | | - ' | - | - | | - | | | - | | , a. u. | , - | | - | | - | | - | • |
| - CASTERIO | | - | | - | - | | - | | 1- | • • | 1 - | | į - | | - | - • | - | • • | - | • • | - | • |
| 490. WA. 495 | ?34 T | 1 + W 0 | ** | 99 4 4 | 4. | 76 61 | 190 | 39 96 | 10 | LT 70 | 07 | 00 10 | - | 75 004 | 2711 | ** 48 * | 1179 | P 184 | 1. | 10 138 | 01 | 41 |
| | a es . (| 10 446 | a == 0 | 36 639 | a 700 | 100 100 | - | 070 OE | 4 | Q97 0 P | 070 | 0.00 | 379 | 14 445 | 490 | 119 | 046 | 10 1.46 | • | • *** •*** | 00 | • |
| - | | | - | | - | | - | | - | | · - | | - | | | | - | | - | | <u> </u> | - |
| LANGERS, 1994 | .::::::::::::::::::::::::::::::::::: | 2009 | | | | 40E 00E | | cacca | i Leen | OCD5 OCD4 | | 6423 0424 | · com do | | - | | | 600 | : ! | CGT5 0000 | i Iome c | |
| SELENGO. mys. | | | | | | | | | , | | | | | | | | | | | | i i | . (40) (40) |
| | , | | | | | | | COMPAN COLOR | | | 900 | - VOLGE | 0004 603 | # c.00= | - a | | • | 100 - | - | - (0) | 1 - 1 | |
| SAMPLE OFF | | • | | | i - | | - | | 1 | 1002 - | - | • - | | - | 0.18 | CE 04 | . - | | ; - | 0.5 7.5 | - | • |
| MUMER mark | 201 00 | | | • • | - | | - | | ! - | | | | - :0 | | . - | 30a - | : - | | - | | | con - |
| TOTAL BISSOURS TOUGH . TOL | 47 4 | · ••• | | √r >× | NT | NT 1946 | - | HT 976 | NT | NT 90 | 4 | VT 000 | NT N1 | 1408 | 1 47 4 | T (317 | · 5T | NT 666 | NT | NT ==0 | NT N | 47 M |
| 10100 | | - N- | | o wr | ļ . | 48 147 | > - | 13 45 | | NT NT | | 9 .,- | ٠. | ,- | 62 4 | 7 HT | | 0 HT | | 9 47 | | |
| SULFERE, MARK | 42 | *** | . • | | 10 | 71 30 | - | 49 79 | 70 | 200 191 | , i 34 | 29 72 | 99 7 | 34 | 340 4 | | ** | 196 119 | * | 71 47 | | - |
| - | | | 000- | - 0.0 | 027 0 | - | 02 | Q94 Q97 | - | - 206 | 1 12 | 13 200 | | % C# | cos | | · _ | | - | | i - | - , |
| | : 40 M | T 2180 | | VT 440 | MT . | OTD #40 | AT | 1210 HIO | NT. | 90 590 | VF | 162 946 | · 1800 H | HO 1016 | 460 | 40 HT | 140 | ee 70 | 1 | | MT 1 | 10 · 2 |
| - | . a | 4 | | a a l | | - 01 | مما | 01.04 | 103 | AL AL | | Q.1 - | Q | | 22 | - 0 | ı | C9 Q1 | 1 | . ما | | |
| MARKET W/70000 | ; | | L2 1 | | i | | | | 1 | | 1 | | | | | | | | 1 | | 94.0 | |
| 44/6 | ! | | ĺ | | 1 | ** | | | [| | ł | •• •• | | | : | | : | | | | 1 4 1 | |
| 100mm. 4 /L | *** | 70 | 190 14 | M 197 | 8 | 70 M | 190 | ~ m | 79 | 192 (36 | 1 307 | 777 140 | 100 g | 77 987 | 1990 | - | | 10 80 | - | ~ ~ | ** * | 7 e0 |
| P\$745500 VL | 77 44 | 3 71 | 48 4 | H 30 | 107 1 | 44 | 4.8 | * | 61 | ** *** | 191 | 79 . | 75 8 | o ee o | י דו | N 26 | 1 164 | 24 76 | 7 | 77 3E | ** 15 | 130 |
| CALDUD, MUL | 200 M | 9 947 | ļ 🕶 m | 137 | one n | . m | 100 | • | | :44 127 | | 97 × | | | ** ** | 75 M | 40 | 79 *1 | - | 7 4 | <i>247 B</i> | 94 47 |
| | | - 94 | 20 9 | - | × • | o ** | • | 37 38 | 30 | ,, , | 1.3 | 47 B | • | o | • | ~ ~ | - | 41 44 | - | ·» ~ | 47 2 | DS 194 |
| | 100 M | 70 | : 660 t | 4T 640 | HT 44 | | ME | 450 16 0 | : NT | , | HP | 200 GEO | *60 14 | | 970 7 | *** | - | 340 % 0 | ₩0 | 40 140 | NT 15 | 00 : 5 0 |
| 116 | 700 W | 400 | (AGG N | of IMB | 14 25 | *** | ; I ness | 7770 at 10 |) 1646 (| OSO 1600 | 1600 | MED 1990 | . 5-00 40 | 40 6 40 · | ~ 70 ≤ | 100 1940 | | 796 :50 | 794 | 790 023 | (100) | *** |
| THATE, AND | | | | | | | i | | | | 1 | C 04 004 | | | | | | - | 1 | - 000 | | |
| | | | 1 | | İ | | 1 | | | | | | | | ı | | | | Į | | | |
| Australia . Harris | 316 3 | | : | | 1 | | 1 | | | | | | | | | | | | ! | 10 09 | | |
| | | | | - 23 | 1 335 14 | 90 40 | 91 | 40 64 | *1 | 50 ·50 | 37 | 98 W7 | 300 4 | ** ** * | 210 8 | 70 000 | - | 90 140 | 40 | 10 79 | | 75 1 |
| :=130000 , ==1 | . 70 4 | - | . — . | 1 | 1 | | | | | | | | | | | | | • | ì | | | |
| SHARRE , MAN | ı | | 44. | | 1 | | - | | · - | | | /4 - | - | ; | - | | | · _ | į - | | RE . | 4 |

⁻II ALL ANALYSIS POPURINDO DE ALFONS EPA 2) — (IPPRODE) ANALYSIS NOVE DETECTOS 3 NY AGRICATOS NOV TESTED

TABLE 6- RESULTS OF ANALYSES ON SOIL

| mare (semenfication min fise ate Samble mas farem | 1-2, S+1 2011 101000 | 3-2, 3-2) 30)†) - 451000) | 411 | 8-2, 1-4 58+1 - 1401848 | 8-2, 5-1 :011 !netano! | (a) 1 | T@17 | 3-2, j-2 (a)1 -41848 | | 1 - 1 - 2 , 1 -4 , 1411 1418 1418 | . 8-2, 5-6 Sp1 melana | 4+2, 3+ 0 30+4 441000 | 18-7, 5-1 1 1811 1 1401448 | . 9-2, 5-2 50-1 1 ********* | 507, 541, 181 191 | .41 | 1011 | ., 6+2 5+6 (a)1 , mptema | Series Series Hellend | Septi | 1-4 |
|--|----------------------------|---|---|---|--|---|---|--|--|--|---|----------------------------------|--|---|--|---|---|---|--|--|--|
| PARAMETERS | Agn-44 | - + | | 70-70 | NO-10 | 10-76 | 12-113 | 123-69 | *** *** |) - \$40- \$40 | 1 970- 9420 : | · 99-915 | 1 70-100 | 10-10 | | P-145 | Y- Y- | 78-10 | 1 10-140 | 190-90 | # ** |
| ** | ٠, | , . | | ٠, | 76 | 7.7 | 77 | 76 | | 44 | ٠, | ٠, | 7 \$ | | ,. | ** | | ٠. | 7.6 | 47 | |
| PROPE | ,- | | | | | | | | ; | | : [| | | | | | • | - | • | | |
| 100 - 1 EF. | | - | | - | | | | | , - | | | | | | | | | | - | | 1 -7 |
| TEAL COLUMN | 4.5 | | _ | ,, - | | 1 | | | | · .,_ | | | | ٠ . | •,, | | : . | | 4.7 | | |
| ********* | 19 | 2 74 | 911 | 2.09 | a (3) | 004 | 0 CH | 3. 9 1 | 001 | 00 | 201 | 0.00 | 200 | 079 | 0 | 0 90 | 201 | - | 9.01 | 1 4 | - |
| CHEMBUL GETTER | , <u>-</u> | | | | V.F | _ ! | .,- | | | | 4.5 | ٠ | } | | | | | _ | | _ : | |
| 24 8 MARK | - | | | | • | + | | | | | | 47 | | | - | | | | , - | ! ! | 4. |
| 10160=1. mg/L | • | - | - | | ۲ | - | | .,. | | | | AT | - | | | | | | | - | ! - |
| The Table 1 | | | .· . | | | - | 9,000 | | . . | • | | 1 | | . | ,,- | W- | | | · - | -22901 | ! • - |
| ETLEME, myll | ٠ - | . • | | | - | | | ! | | | | NT | | . , | .,, | . . | | | | AT | ٠ _ |
| eca's, mpl | | - | - | | _ | - | | | - | | · _ | - | | | | w. | . ,,- | | - | ACT | .م |
| 7. | | | | | | ! | | | | | : | | ! | | | | | | i | | |
| LEAD, mg/L | 200 | Ø 03 | (009 - | (0.03) | 000 | 10 as j | (O O D | · 200 | 0.03 | (000 | (Q 0 b | (0.03 | 0.0 | 311 | ٠,٠٠ | (0.03 | 0.03 | (0.03 | (0.05 | , | • |
| COPPER. mg/L | 9.00 | 3.11 | 401 | 2.00 | • معن | 0.00 | 0 00 | 0.000 | 0 00 | 0 00 | 0.00 | 0.00 | an. | , a ces | ur . | ာတာ | ° 000 | 200 | 400 | | |
| 104. 44 | - | - | ٠. | - | - ; | - | | _ | - | - | - | - | - | - | - } | _ | - | - | - | | <u> </u> |
| >************************************* | 404 | 9.02 | 0.00 | 3.00 | a cc | 4.00 | c.000 | 000 | 400 | 0.00 | 0.00 | 0.00 | 4.01 | ۰.00 | ur | معت ا | 000 | 9.00 | 0.000 | | |
| CHARLES ASSESSED. | - | _ | _ : | | _ | - ! | - : | - | _ | - | ! - | † - | _ | - | - | - | _ | - | - | Vr. | ١. |
| test, agr. | ۰. | c.o | 40 | 00 | 40 | 00 | 6.0 | yr . | 40 | . 0.0 | 0.0 | 20 | 4 | 64 | - | 40 | 40 | 0.0 | 0.0 | 1 | • |
| | 200 | o 00 | 400 | 0.00 | 0.00 | 900 | 900 | • • · | - CED | 400 | 400 | 0.00 | 000 | 0.00 | 47 | 900 | 0.00 | · 000 | 000 | | - |
| ASS. 1005. 100/s. | ` 3 .i | a. | 4.0 | 22 | a 3 | 1. | 04 | Q.I | 10 | 0.9 | · a.: | 01 | 0.2 | a.s | 45 | d.9 | 0.9 | 0.8 | at | - | ١, |
| | 0.04 | a0 1 | 100 | 007 | 000 | 003 | 203 | 202 | ocat | . • 👄 | 001 | 001 | O. 29 | 0.17 | 46 . | 0.40 | 400 | 3.00 | 0.00 | | |
| | (205 | .009 | 400 | 0.09 | 4000 | ~⊤ | 4* | •1 T | .209 | 4 1 | '0.09 | (005 | < 6.09 | (0.04 | 47 | (0.09 | ·000 | ,0.0 5 | (0.09 | - | |
| 1490mCpA | (0.00) | 14 0.000 1 | 0.000 | 0 000 | (0 000 | 0000 | 0.000 | (0.00) | 0.008 | 0.000 | (O.00) | (C. 550+ | 0.004 | 0 0004 | NF. | 3.000 | (000) | (0 00) | (0.00) | 47 | |
| SELEMENT, MAYL | - | - ; | ! | - ! | - ! | - j | - | - | - | - | - | - | - | : - | - i | - | - | - | - | 47 | 1 |
| MARINE , mg/L | O-1 | 30 | ١٥٥١ | 0.0 | 00 | 00 | 0.0 | 00 | 0.0 | 00 | . 00 | 0.0 | 00 | | MF | 00 | 20 | | 00 | - | • |
| SAJER, MAZIL TOTAL BUSINESS | MT | . HT : | NT | MT | NT | ~7 | NT | MT | NT | NT | MT | HT | ~ * | ~ T | WT | MT 1 | 47 | yr. | 47 | . سپي ا | |
| 10UM | MT | | | | | | 1 | i | | ; | | | | ' ' | | | | | | | |
| 10044 | | NT : | MF | NT | WF | NT | NT | MT | MF | MT | 4 F | NF | MT | MT | WT | 47 | 45 | 47 | NT. | ~ | |
| | MT. | NT | NP NP | NT NT | NT | ~1 | NT NT | NT NT | MT | NT NT | NT | NF | MT | NT | NT | ~* | 47 | *** | i . ч₹ | 45 | ۱ • |
| NUME, my | MT. | | NP 94 | 1 | NT T | NT NT | 1 | MT U | NT G | • | 70 | MT 49 | NT 90 | 47 35 | NT NT | 47 | 47 | 29 |) - ~ T - 343 | ur ur | 1 4 |
| SULPHIE, my L | i o | 29 014 | N.F 94. 0.14 | 7 000 | N F 4 0.00 | 41 MT - | ₩F 10 - | 4 F u | N7 6 | • | 700 700 | 47 | NT 90 | NT 35 QII | NT NT | 009 | 47 | 13 | 94T 243 | 4F 4F 4F | 1 4 |
| SULPRE, my L modification, my L ALEMANTY, my L | 10 - NT | 29 | NP 94 | NT (7 | NT T | 41 MT - | NT 10 - | MT II — NT | NT IG G-GGD MT | NF - NT | 70 700 700 | 47 600 NT | NT :30 0.38 NT | MT BS GII MT | MT MT MT | 009 NT | 42 000 | 15 000 | - - | ur ur ur ur | 1 4 |
| SULPRE, myrk modification, myrk ALEAGETT, myrk ministeriume, myrk | 10 - NT | 29 OH NT | N.P. 94. 0.14 N.T. | NT .7 | O.GO NT O.I | NT - | NT 10 - NT - | MT U — MT | 10 G G G G G G G G G G G G G G G G G G G | NT . | 20 000 NT | 47 400 NF | 90 0.38 HT | NT 39 QII NT Q\$ | NT NT NT NT | 009 NT | 42 42 42 42 42 42 42 42 42 42 42 42 42 4 | 25 200 47 | - 4r | ur ur ur ur ur | |
| SULFATE, MULL MICEPHANES, MULL ALEMANTY, MULL MITTAGE MITTAGES MULL MARKET - MITTAGES MULL MULL MULL MULL MULL MULL MULL MUL | 10 - NT | 29 0.45 NT 01 | NP 76 0.16 NT 3.1 | NT (7 000) | O.GO MT G.I | NT - | NT - NT - | MT - MT - MT | 10 GGG MT G-1 | NT - NT | 20 000 NT 04 | 49 600 NF GJ | 70 0.20 HT GI NT | MT DS QU MT QS MT | MT MT MT MT | OO9 NT OJ NT | 47 43 400 47 41 | 15 200 47 20 | | 4T 4T 4T | 1 |
| SULPRE, mp. (PROPRIETO, mp. (AL MARITY, mp. (ALMARITY, mp. (ALMARITY, mp. (ALMARITM, mp. | 10 - NT | 29 045 NT 01 NT | NP 94 0.16 MT 3.1 MT | NT COS NT CU NT NT | NT G.00 NT G.I NT | NT - NT NT | NT - NT NT | NT U NT NT NT | NT 00 000 MT 0.1 MT NT | NT - NT NT | 70 00 NT 01 NT NT | 47 48 48 47 47 47 | NT 120 0.286 HT G.I NT NT | NT 35 GII NT GE NT | MT MT MT MT MT | NT OU NT NT | 47 42 43 47 41 47 | 15 G00 UT G0 | 26 26 27 27 | 47 47 47 47 47 47 | |
| SULFATE, MULL MICEPHANES, MULL ALEMANTY, MULL MITTAGE MITTAGES MULL MARKET - MITTAGES MULL MULL MULL MULL MULL MULL MULL MUL | IO III | 29 0.45 NT 01 | NP 76 0.16 NT 3.1 | NT 7 000 NT GJ NT NT E7 | O.GO MT G.I | NT - | NT - NT 14 | NT U NT - NT NT NT NT | NT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | NT - NT | NT 20 000 NT 01 NT NT 06 | NT 49 400 NT 47 NT 22 | NT 130 0.28 NT G.I NT NT 74 | NT D9 GH NT GT NT Ad | NT NT NT NT NT NT | NT 0.09 NT 0.1 NT NT 44 | 47 42 000 47 41 47 47 | 15 100 17 100 17 100 | 47 24 47 47 47 | 47 47 47 47 47 47 | |
| SULPRE, mp. L PRESPONDE, mp. L ALBAMETY, mp. L MINISTER - MYTEROETH MANAGEMA - MYTEROETH MANAGEMA - MYTEROETH MANAGEMA - MYTEROETH MANAGEMA - MYTEROETH MANAGEMA - MYTEROETH MANAGEMA - MYTEROETH MANAGEMA - MANA | 10 - NT - NT NT | 015 NT NT NT NT NT NT NT | NP 94 0.14 NP 31 NP NT AQ | NT IT GOOD NT GU NT NT ET | NT G.00 NT G.I HT HT 123 NT | NT NT NT NT NT NT NT NT | NT - NT 14 NT | MT U T MT MT MT MT MT | NT 0 0.000 MT 0.1 NT 1.9 MT | NT | NT 20 COO NT OI NT OF NT OF NT | NT 49 400 NT 41 NT 22 NT | NT 20 0.28 NT 0.1 NT 74 NT | AT B9 GH NT GR NT AG NT | NT NT NT NT NT NT NT NT NT | NT 009 NT 04 NT NT 44 NT | 47 42 0.00 47 0.1 47 47 34 | 25 200 47 20 47 40 47 47 12 | 47 38 - 47 - 47 - 17 | 47 47 47 47 47 48 48 48 48 48 48 48 48 48 48 48 48 48 | 1 |
| SULFATE, mg/L ALEMANTY, mg/L ALEMANTY, mg/L AMMENIA - mYTHORES SURFACE, mg/L AMMENIA - myTHORES CALENDES, mg/L CALENDES, mg/L AMMENIAS, mg/L | 10 | 29 016 NT 01 NT 20 NT | NP 74 0.16 MT 31 MT 40 MT | NT OOD NT GLI NT NT ST NT | NT GGD NT GI NT NT GGB NT NT | NT NT NT NT NT NT NT NT | NT - NT 14 NT NT | NT | MT G GGB AT GI NT L9 AT NT | NT | 20 000 NT OI NT NT OS | 45 G00 NT OJ NT 22 NT NT | NT :20 0.286 NT OI NT NT | AT B9 GH NT GT NT AG NT | NT NT NT NT NT NT NT NT NT NT | NT 009 NT 04 NT 44 NT NT | 47 42 000 47 61 47 47 34 | 29 G00 HT G0 HT HT L2 HT | 47 47 47 47 47 47 | 47 47 47 47 47 47 47 47 | |
| SULPHE, myrt, modification, myrt, ALCHARTY, myrt, mortiste-colores, myrt, Assessmin - myrthester myrt, Stemmin, myrt, Performan, myrt, CALCHART, myrt, machinisting , myrt, machinisting , myrt, | 10 | OM OI OI OI OI OI OI OI OI OI OI OI OI OI | NP 94 0.14 NP 31 NP NT AQ | NT IT GOOD NT GU NT NT ET | NT G.00 NT G.I HT HT 123 NT | *** *** *** *** *** *** *** *** *** ** | NT - NT 14 NT NT NT | NT | MT GGO AT GG I GG I GG I GG I GG I GG I GG I G | NT - NT 21 NT NT NT | NT 20 000 NT 01 NT 05 NT 05 NT NT NT | NT 47 400 NT 0J NT 27 NT NT NT | NT :50 0.28 NT GI NT NT NT NT NT NT | AT DS GH NT GR NT AG NT AG NT NT | NT NT NT NT NT NT NT NT NT NT NT NT NT N | NT 009 NT 04 NT 44 NT NT NT | 47 42 400 47 61 47 47 34 47 | 29 200 47 20 47 47 12 47 | 47 24 47 47 47 47 47 47 | 47 47 47 47 47 47 47 47 | 1 |
| SULPRE, mp/L PRESPONDE, mp/L ALBAMETT, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L MINISTER, mp/L | IO - NT NT NT NT NT | 29 016 NT 01 NT 20 NT | NP 74 0.16 MT 31 MT 40 MT | NT OOD NT GLI NT NT ST NT | NT GGD NT GI NT NT GGB NT NT | NT - NT NT LG NT NT NT NT | NT - NT NT NT NT NT NT | NT | MT GGO AT GG AT GG AT GG AT AT AT AT AT | NT NT 21 NT NT NT | NT 00 NT 01 NT 06 NT NT NT NT NT | NT 49 400 NT 01 NT 22 NT NT NT | NT 30 0.28 NT NT NT NT NT NT | AT DS GH NT GS NT NT AG NT NT AG NT NT | NT NT NT NT NT NT NT NT NT NT NT NT NT N | NT 009 NT OU NT NT 44 NT NT NT NT | 47 42 400 47 41 47 47 46 47 47 47 47 | 25 200 47 20 47 20 47 12 47 47 | 17 17 17 17 17 17 17 17 17 17 17 17 17 1 | 41 41 41 41 41 41 41 41 | 1 |
| SULPHE, myrt, modification, myrt, ALCHARTY, myrt, mortiste-colores, myrt, Assessmin - myrthester myrt, Stemmin, myrt, Performan, myrt, CALCHART, myrt, machinisting , myrt, machinisting , myrt, | NT NT NT NT | OM OI OI OI OI OI OI OI OI OI OI OI OI OI | NP 74 0.14 NP 31 NP 449 NP 449 NP NP | NT 17 000 NT U NT U NT U NT U NT NT | NT | *** *** *** *** *** *** *** *** *** ** | NT - NT 14 NT NT NT | NT | NT G G G G G G G G G G G G G G G G G G G | NT - NT 21 NT NT NT | NT 20 000 NT 01 NT 05 NT 05 NT NT NT | NT | 77 30 0.38 NT 0.1 NT 74 NT NT NT NT 0.01 | NT DS GH NT GS NT NT AG NT NT NT NT NT CO | NT NT NT NT NT NT NT NT NT NT NT NT NT N | 009 NT OU NT NT 44 NT NT NT NT | 47 42 400 47 47 47 47 47 47 47 | 25 200 47 40 47 47 47 47 47 47 | | ** ** * * * * * * * * * * * * * * * * * | 1 |
| SULPATE, mp/L PACEPHORIES, mp/L ALEMENTY, mp/L WINDER-WINTE, mp/L AMMINIST - WITHOUTH Mp/L SOSTOR, mp/L CALDIAGO, mp/L AMMINISTO, mp/L AMMINISTO, mp/L AMMINISTO, mp/L AMMINISTO, mp/L AMMINISTO, mp/L | IO - NT NT NT NT NT | 29 OM NT OI NT 20 NT NT NT | NT 94 014 NT 31 NT 440 NT HT | NT (7 OOS) NT OJ NT NT NT NT | NT .0 G.000 MT .0 I .0 I .0 I .0 I .0 I .0 I .0 I .0 | NT - NT NT LG NT NT NT NT | NT - NT NT NT NT NT NT | NT | MT GGO AT GG AT GG AT GG AT AT AT AT AT | NT NT 21 NT NT NT | NT 00 NT 01 NT 06 NT NT NT NT NT | NT | NT 30 0.286 NT 0.1 NT NT NT 0.01 NT | NT DS OH NT OS NT NT NT NT OS NT | NT NT NT NT NT NT NT NT NT NT NT NT NT N | NT OU NT NT NT NT NT NT NT NT NT NT NT NT NT | 47 42 400 47 41 47 47 46 47 47 47 47 47 47 47 47 | 25 200 47 20 47 47 12 47 47 47 47 | 47 47 47 47 47 47 47 47 47 47 47 | * | 1 |
| SULFATE, mp/L ACMANDET, mp/L ACMANDETT, mp/L AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE AMMINIST OUTSOCKE CHARACT OUTSOCKE CHARACT OUTS | 10 | 29 OM NT OI NT 20 NT NT NT NT NT NT | NT 94 0.14 NT 3.1 NT 4.0 NT NT NT NT NT NT NT NT NT NT NT NT NT | NT OOD NT OJ NT NT NT NT NT NT NT NT | OCO OCT OCI OCI OCI OCI OCI OCI OCI OCI OCI OCI | NT - NT - NT - NT NT NT NT NT NT NT NT NT NT NT NT NT | NT - NT 14 NT NT NT NT NT NT | NT | NT G G G G G G G G G G G G G G G G G G G | NT - NT 21 UT NT NT NT NT | NT 30 000 NT 31 NT NT 4T NT NT NT NT NT NT NT NT NT NT NT NT NT | NT | 77 30 0.38 NT 0.1 NT 74 NT NT NT NT 0.01 | NT DS GH NT GS NT NT AG NT NT NT NT NT CO | NT NT NT NT NT NT NT NT NT NT NT NT NT N | 009 NT OU NT NT 44 NT NT NT NT | 47 42 400 47 47 47 47 47 47 47 | 25 200 47 40 47 47 47 47 47 47 | | **** | The second secon |
| SULFATE, myrt, mcgamana, myrt, ALMANATY, myrt, mrama-marrie, myrt, foliana, myrt, foliana, myrt, mcdamana, myrt, mcdamana, myrt, mcdamana, myrt, mcdamana, myrt, mcdamana, myrt, mcdamana, myrt, mcdamana, myrt, e. e. E., myrt, Chianae, myrt, Museum | 10 | 19 OM NT OI NT 20 NT NT NT NT NT NT NT | NT 94 0.16 NT 3.1 NT 4.0 NT 4.0 NT NT UT NT GOI NT | NT IT NT NT NT NT NT NT NT NT NT NT NT NT NT | NT GGO NT GI NT SSS NT NT NT NT GGI NT | NT - NT - NT - NT NT NT NT NT NT NT NT NT NT NT NT NT | NT - NT 14 NT NT NT NT NT NT NT NT NT NT NT NT NT | NT NT NT NT NT GGG | MT | NT | NT 30 000 NT 04 NT 05 NT NT NT NT NT NT NT NT NT NT NT NT NT | NT | NT 30 0.286 NT 0.1 NT NT NT 0.01 NT | NT DS OH NT OS NT NT NT NT OS NT | NT NT NT NT NT NT NT NT NT NT NT NT NT N | NT OU NT NT NT NT NT NT NT NT NT NT NT NT NT | 47 42 400 47 41 47 47 46 47 47 47 47 47 47 47 47 | 25 200 47 20 47 47 12 47 47 47 47 | 47 47 47 47 47 47 47 47 47 47 47 | * | |

| A | 7H 7H | 1 |
|--|-------------------|---|
| A | 44 44 | , , , , , , , , , , , , , , , , , , , |
| A | ì | - |
| A | | A |
| 100 | 424 | |
| AN AN AN AN AN AN AN AN AN AN AN AN AN A | ••• | |
| 14 | 4 4 | |
| The The The The The The The The The The | 44 44 | |
| The color of the | 46 46 | |
| THE STATE COLOR CO | 44 44 | 300.000 |
| Mar. | 672 1d | ! |
| 1 | 1 | Ann allegan |
| THE THE THE THE THE THE THE THE THE THE | - | |
| A | | - |
| 44 - 880 880 880 880 880 44 40 80 80 80 80 44 40 80 80 80 80 80 80 80 80 80 80 80 80 80 | - | |
| AL | 10 10 | i Age , Williams . |
| A | ##O | · · · · · · · · · · · · · · · · · · · |
| 1 | 62 , Di | 1/4- (840/44) |
| 14 14 200 200 200 200 200 200 200 200 200 20 | A- , A- | |
| 17 | 44 . 45 | Wilder, coulds |
| TY TY 0000 0000 0000 0000 0000 0000 000 | ** : ** | A Print Control |
| 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 60 10 | Ages , married |
| 11- 41- 000 000 000 000 000 000 000 000 000 0 | - | Ages (MINISTER) |
| 1 1 2 20 500 500 500 500 500 500 500 500 50 | | , Andre , C |
| At 1 200 000 000 000 000 000 000 000 000 0 | (37) | , |
| | E0 101 | |
| | 10 12 | |
| AN AN 600 000 000 000 AN 0000 000 000 000 000 0 | | : |
| 44 40 00 00 00 00 00 00 00 00 00 00 00 0 | ** | |
| | | 344 |
| | 567 ID-0 | |
| | | |
| 000 000 000 000 000 000 000 000 000 00 | II-O 51% | |
| | | ! |
| | | i |
| | | y é -1,834 |
| | | July Temples |
| | _ | * |
| | - • · | |
| | - • | |
| (abotati) | | ************************************** |
| | - | - |
| 40 40 40 40 40 40 40 40 40 40 40 40 40 4 | | |
| | • | ~ |
| | | 'Al 1 - 000 |
| | | 1 |
| - A - A - A - A - A - A - A - A - A - A | 200 Z10 | |
| | | |
| Carta Carta i Carta i Carta i Carta Carta i Ca | 200 Z10 | SEZIJAVUT: |
| Section Sect | 210 210 8-9 4. | SKILDARYY. |

TABLE 6- RESULTS OF ANALYSES ON SOIL

| *** | | Ŧ, | | <u>.</u> | j | ş | • | | ş | 5 | , | 3 | 1 | , | 3 | 4 | • 10 | | 9 |
|-----------|--------|-----|-------|----------|-----|------------|-----------|----------|----------|--------------|-----------|------------|------------|-----------|--|------------|-----------|----------|-----|
| | | | | | 1 | | , | ,, | 1 | | 1 | | ļ | | | Ì | | 1 | ı, |
| | *• | : | • | : | | <u>:</u> | : | i i ž | <u>:</u> | 5 | ţ | 17.5 | Š | Ę | | Ė | ! | | 1 |
| BADLDON . | | | | | | | | | | | | *** | | - | | | | | |
| 1 | : | : | ÷ | ; | ; | • | : | ; | : | | ۲, | ; | | - | ţ | • | 5 | : | : |
| | , | , | ; | ; | , | • | 1 | • | 1 | | • | • | | • | • | | , | | 1 |
| | : ! | , | . • | . • | : ! | ! | ! | ; | • | | , | , | | ; | • | ; | ; | į | j |
| 1 | ; | , | ; | , | ; | ; | ì | ; | ; | | ; | ; | | ···· | ; | ; | - • | , | ŧ |
| | ·, | B : | t. | : | 7 | , | | , | ŗ | | , | <u></u> | | ; | , | ; | ; | , | Ì |
| 1 | | Ę | | | ; | 9 | 2 | ŧ | | | ; | ; | | ż | <u>,</u> | ţ | Ļ | • | 1 |
| | • | Š | 1 | 2 | ţ | • | 1 | \$ | ; | | ţ | \$ | | · · | ; | ţ | , | į | 1 |
| + | | 7 | | • | \$ | £ | t | , | • | | , | ; | | · | - ; | \$ | ţ | • | ţ |
| 1 | | | | ; | , | , | • | | ١ | | ţ | \$ | | • | • | | | | • |
| . 1 | | | | | | • | | | | | ; | ; } | | | | ٠ ; | | | i |
| 1 | , | | | ; | | 1 | | Š | • | • | • | 2 | - | <u>,</u> | | 3 | 3 | | ţ |
| 1 | , | | • | ; | • | • | • | 3 | • | ٠. | \$ | 3 | - | Ę | 3 | 3 | 2 | | ì |
| 1 | , | | | , | 7 | , | | • | • | _ | 3 | 1 | | 9.00 | 67 | 2.3 | | į | \$ |
| | | | | | } | | | - | | _ | ! | <u> </u> | | - | | - | • | | i |
| | _ | | | | | - | | | | | | | | | | | | | |
| Ş | | 8 | | , | ; | • | | , | | | \$ | ţ | 5 | 5 | \$ | • | 5 | : | • |
| 1 | | ē | | , | ķ | į. | 1 | ţ | | | Ļ | \$ | 5 | ţ | <u> </u> | ţ | ; | • | å |
| 1 | • | ā | | | ; | ń | | ; | • | | ţ | ; | ; | ţ | ţ | ţ | \$ | • | • |
| 1 | | : | , | | , | | 3 | * | • | | , | ; | ţ | \$ | , | \$ | • | | 1 |
| | | | • | 1 | , | , | • | * | ٠ | | , | ; | \$ | • | , | • | , | | ' |
| 5 | | | | | | | | | | | - | | | | | ; | | | ı |
| ş | - | ~ | | • | ţ | 3 | : | ţ | • | | ţ | ; | \$ | \$ | , | ' | - ; | • | • |
| 1 | • | , | | , | ţ | 8 | • | • | • | | \$ | \$ | ţ | ; | \$ | ţ | \$ | , | • |
| * 1 | | | | 8 | ŧ | ř | 2 | ţ | 8 | _ | 5 | ; | • | \$ | \$ | , | F | į | ð |
| 1 | ğ | | 2 | 8 | ţ | 2 | \$ | , | 4 | ; | <u>.</u> | * | , | , \$ | ţ | ţ | · | 9 | · |
| 1 | | | 1 | , | ţ | 2 | ţ | • | • | | , | • | , | \$ | , | | • | ۱ | • |
| | | • | | - | | | | | | | | - | | - | | | - | | |
| i | 1 | ē | Ř | Á | , | | ğ | \$ | 8 | ٠. ۶ _ | ŀ | , , | ķ. | | ţ | <u>.</u> | \$ | • | ş |
| | , | • | I | , | , | | 8 | , | | ; | , , | Ļ | Ļ | | ţ | , | Ļ | | • |
| ````\ | , | ř | ō | ī | 7 | 6, | C | ; | • | , | , | Ļ | Ļ | - | ··· · | ţ | ţ | 1 | j |
| | , | 5 | 8 | 8 | , | 8 0 | • | ţ | • | ; | ì | ţ | ţ | ; | 5 | ţ | ŧ | , | • |
| | · \$ | , | ţ | , | , | , | | • | , | | , | • | , | • | • | • | , | , | - 1 |
| | | | , | - | ; | | - : ! | : | i | | ; | ; | į | | i | ; | · | ; | 1 |
| | - 1 | ; | ; { | , , | | k (| ı į | ; | ٠ 1 | | , | ; ! | ; ! | | , ! | , 1 | ; ! | 2 | 5 |
| | : | } | ; | | , | 1 | ? | ; | 3 | | ; | i | ; | | ; | ; | | <u> </u> | t |
| í | | | - | ģ | , | 9 | • | <u> </u> | ŧ | | 5 | r T | ţ | | ; | ţ | ; | • | j |
| - | ; ; | • | 8 | 8 | Ļ | ; | , , | ; | 5 | | ÷ | ; | , | | ; | , | ; | į. | 2 |
| 1 | ; | 5 | ţ | ţ | Ļ | 5 | 1 | <u>.</u> | ŧ | | \$ | ; | - \$ | - | <u>, </u> | , | <u> </u> | • | 1 |
| | 3 | : | 800 | 3 | ţ | 2 | 196 | ; | \$ | | ; | Ļ | ţ | | ; | \$ | ţ | å | 3 |
| 1 | ţ | Į | : | : | ţ | ŧ | E | \$ | 2 | | , | · ; | ţ | - | ÷ | · _ | ţ | Í | 1 |
| - | : | į | ; | 1 | \$ | 3 | : | ţ | 1 | ï | ; | \$ | Ļ | • | ţ | <u> </u> | <u> </u> | s | 1 |
| - | : | 1 | | 1 | ţ | Ē | ; | | : | | , | ţ | } | | ţ | ; | ; | 3 | |
| í | * | | • | 1 | • | 1 | 1 | · | 1 | | ì | t | • | | ; | - | • | • | |
| | : | ! | | , | i |) | , | ; | 1 | | i | | ; | | ; | ; | - i | <u> </u> | 3 |
| { | ÷ | • | E | 1 | • | t | ţ | • | \$ | | ţ | ţ | ţ | | ţ | 5 | ţ | ŧ | |
| • | ŧ | ţ | ţ | ŧ | ţ | • | ı | \$ | ş | | , | ţ | ţ | | ţ | 5 | , | • | ţ |
| 1 | • | 970 | 1 | 1 | ţ | | R | ; | • | | ; | ţ | , | | <u>;</u> | ; | \$ | • | • |
| 1 | : | : | 3 | | \$ | : | ; | ; | ţ | | , | ; | ÷ | - | ţ | ŧ | \$ | į | 6 |
| 1 | : | : | 1 | : | ţ | • | ŧ | ţ | • | | ; | ; | ; | | , , ; | ţ | ì | į | 1 |
| 1 | 4 | - | | | • | ţ | 1 | | • | | | | | | - 1 | | , | | • |
| | | | | | , | | : ; | | | | | | | | | | | | |
| | | | | | • | | | | • | | | | | | ļ | | | | |

TABLE 7" RESULTS OF MALTRES ON SURFACE WATER SAMPLES

| TABLE 7" "RESALTS OF MALTERS ON BURNING MATTER SAMPLES | | | | | | | | | | | | | | | | | | | |
|--|----------|-------------------|---------|----------|------------|------------|----------|----------|---------|------------|-------------|-------------|-----------|----------|----------|---------------|------------|----------|-----|
| | سييب | -==- | حيي | سييب | ~=- | | ستت | = | حيّــ | | ستت | -==- | - | | -== | | - | <u> </u> | |
| | 7.81 | | •• | • • | | •• | • • | | · | | | 1/4 | 4904 | •40 | 199 | | | | |
| *********** | • | | | | | | | | | | | | ! | | ļ | | : | | |
| _ | •• | •• | •• | ** | •• | | •• | ** | •• | •• | | - | •• | •• | | •• | - | | •• |
| <u> </u> | | ** | | ** | 47 | | 1010 | 47 | | •• | | 47 | 48 | * | | 47 | | **** | |
| | · •• | | 44 | •• | • | ~~ | •• | 47 | -7 | | ! | ** | •7 | | -7 | -7 | - | • | " |
| | •• | - 279 | | | 47 | . 47 | i47 | - | •• | 47 -7 | 47 | - | -7 | | | | - | | - ! |
| | • | • | _ | | - | | | | | | , , | | | , | | | | i | i |
| 4. 4 4000 | : | pes w | | - | ur ur | 724 | - | 47 47 | 48 | ** | | ** | ** | 47 | -7 | - | - | | - |
| - | | - | | ., | - | - | | - | | _ | - | | - | - | ! | | | | - |
| ~~~ | | | - | 40 | - | 780 | - | | - | 2000 | - ! | - | 1000 | | | | - | | - |
| 1945.446 | - | , - | - | -7 | - | | | | - | - | - | - | 10000 | **** | | | ,,,,,, | i - | - |
| 45°. 4 | | | - ! | - | - | | - | • | - : | - | | * | /100 | | | | - | _ | - |
| | | • | | | | | | | | | : ! | | | | | | | : : | 1 |
| -44.40 | ١. | 1 00 | - | - | -7 | *** | 100 | 44 | | 47 | - | | - | - | | | - | 44 | - |
| | : 04 | | - ' | - | 47 | . ** | • ••• | 47 | - | 47 | 47 | | - | - | - | • | - | • | |
| | [] | 34 5 89 | - | - | ., | 30 | Aug | - | - , | | - up | | - | -7 | | 4 | | - | - |
| | | | : [| - | ., | - | - | - | - | - | - | •* | - | | 47 | ** | * | - | = |
| - | 24 | 29 | _ | | 47 | | •• | - | _ : | | | - | - | | - | | | 4.0 | - |
| - | | - | - | - | | | - | - | ! | - | - | - | | - | - | | | | - |
| | | -1 | | • | - | 201 | to | • | - | | ! | * | - | | - | - | - | بغد | |
| | • | . • | 2m 1 | • | - | | E-00 | • | | | | ** | • | - | | - | - | 140 | |
| | | - | - | - ' | ₩. | 3.0 | • | • | • | - | | - ! | - | | | - | - | - | - 1 |
| | - | 3 284 | : - | 3 400 | ** | 2000 | 2000 | | . 0.000 | | -+ i | √ 7 | * | | | | | | -1 |
| **** | | - | - | - | 49 | • | 1 | ** | | 40 | | 47 | - | | 47 | - | * | - i | - 1 |
| | - | 91 | 3. | 3.4 | ~ 7 | 3.0 | 22 | 47 | i - i | - | ₩₽ | 47 | 47 | -7 | - | - | | - ! | ! |
| 100 mg/L | - | 20 | 300 | 300 | ** | •• | - 1 | | ; - [| •• | 47 | ** | -F | - | | - 1 | • | - | - |
| 22 | * | 40 | ** | 47 | 47 | | ~ | ₩. | | ur (| ** | 47 | 47 | | 47 1 | - | - | ** | - |
| | , | . ~ | T | - | • | | - | ** | ' •] | 4 F | 44 | ** | • | - | 40 | - | | - | ~ |
| | - | *** | 71% | ** | 47 | • | - | 47 | | ur ur | 47 · | - | ** | | ••• · | ** | - | - | |
| | | 100 | . = | - | WT | | MT . | | | - T | 47 | HT I | WF 1 | ا ۳۰۰ | ** | | 47 | | |
| | 20 | | - | <u>_</u> | | 41 | _ | | 4. | ur- | • | 47 | | | | | - | | - |
| | 348 | 14 | . 262 ; | 340 | =* | 1940 / | 247 | 47 | | 47 | | 47 | - | | | - | v r | 440 | |
| | *** | . | ••• | •• | 4 7 | 790 | - · | 47 | • | 47 | 47 | • | - | - J | ا | 47 | * | *** | - |
| | 4.0 | . 19-9 | | - | - | : | ** | 47 | - | 47 | ** , | | - | | - | | - | - | |
| | ▶◆ | - | - | - | 47 | | | 47 | - | 47 | ! | - | 100 | ** | 47 | ut. | 47 | - | - |
| | = | - | - | - | 47 | • | • | 47 | . •• | - | | | - | - | -7 | - | ** | - | - |
| | #7 | - | | - | | at | - | ** | | - | • | • | ** | - | - | ** | ** | - | - |
| ***. | ** | • | ** | 47 | *** | | - | 47 | | | ** | 10 7 | | - | *** | 147 | ** | | - |
| *************************************** | - | - | - 1 | - | - | •== | •= | WF | - | •• | ~ | | - | ** | - | ** | ** | - | - i |
| ***** | b+ | ! • ● : | •• | 200 | 47 | 10 | • | ** | - | | 7 | 47 | - | - | 47 | ** | ! | · • • · | S |
| · | 30 | ; ** | - | •• | | *** | | #T | - | ** | - | * | 4 | •* | - | - 1 | - | - | - ' |
| | 34 | | | - | | - | 20 | • | | | - | 47 | | - | | - | _ i | | |
| | | | | | • | | •• | | - | | | ٠. | | | | | | | |

TABLE 8

Criteria Used in Determining Levels of Contamination

| • | | 1 | | 2 | | 3 |
|----------------------------|---------|-----------------|---------|-------------|----------|-------------|
| · • | SURFACE | • | GROUNDW | ATER | EFFLUE: | <u>IT</u> " |
| | Lower | Upper | Lower | Upper | Lower | Upper |
| P 3 | ·imir | * !- ! ! | T.imir | Timit | | 12.25 |
| i | | | | | | |
| Alkalinity | NE | NE | NE | NE | NE | NE |
| Ammonia (NH4) | NE | 1.5 | NE | 1.5 | NE | NE |
| Arsenic (As) | NE | 1.0 | NE | . 05 | NE | .25 |
| Barium (Ba) | NE | 5.0 | NE | 1.0 | NE | 2.0 |
| BOD-5 | NE | NE | NE | 30.0 | NE | 30.0 |
| Boron (B) | NE | 1.0 | NE | 1.0 | NE | NE |
| Cadmium (Cd) | NE | .05 | NE | .01 | NE | . 15 |
| COD | NE | NE | NE | NE | ne | NE |
| Chloride (Cl) | NE | 500 | NE | 250 | NE | NE |
| Chromium (Cr Tot.) | NE | NE | NE | . 05 | NE | NE |
| Chromium (Cr+3) | NE | 1.0 | NE | 1.0 | NE | 1.0 |
| Chromium (Cr+6) | NE | .05 | NE | .05 | NE | .3 |
| Copper (Cu) | NE | . 02 | NE | .02 | ΝE | 1.0 |
| yanide (Cn) | NE | . 025 | NE | . 025 | NE | . 1 |
| issolved Oxygen | 5.0 | NE | 5.0 | NE | NE | NE |
| Fecal Coliform | NE | 400.0 | NE | 400.0 | NE | 400.0 |
| ; Flouride (F) | NE | 1.4 | NE | 1.4 | NE | 15.0 |
| Hardness | NE | NE | NE | NE | NE | NE |
| Iron Total (Fe) | NE | 1.0 | NE | 1.0 | NE | 2.0 |
| Iron Dissolved (Fe) | NE | NE | NE | .5 | NE | . 5 |
| 'Lead (Pb) | NE | .1 | NE | . 05 | NE | . 1 |
| Magnesium (Mg) | NE | NE | NE | NE | NE | NE |
| Manganese (Mn) | NE | 1.0 | NE | . 15 | NE | 1.0 |
| Mercury (Hg) | NE | .0005 | NE | . 0005 | NE | .0005 |
| Nickel (Ni) | NE | 1.0 | NE | 1.0 | NE | 1.0 |
| Nitrate (NO ₃) | NE | NE | NE | 10.0 | NE | NE |
| (311 | NE | NE | NE | .1 | NE | 15.0 |
| PH | 6.5 | 9.0 | 6.5 | 9.0 | 5.0 | 10.0 |
| Phenols | NE | .1 | NE | .001 | NE | . 3 |
| Phosphorous (P) | NE | .05 | NE | .05 | NE | 1.0 |
| i-Potassium (K) | NE | NE | NE | NE 500 | NE | NE |
| .O.E. | NE | 1000 | NE | 500 | NE | 3500 |
| Selenium (Se) | NE | 1.0 | NE | .01 | NE | 1.0 |
| Silica (Si) | NE | NE | NE | NE .005 | NE | NE |
| Silver (Ag) | NE | .005 | NE | | NE | . 1 |
| Sodium (Na) | NE | NE | NE | NE NE | NE NE | NE |
| SC | NE | NE | NE | NE 2 S O | NE | NE |
| Sulfate (SO ₄) | NE | 500 | NE | 250 | NE | NE |
| Sulfide | NE | NE | NE | NE | NE | NE |
| rs . | NE | NE | NE | NE 15 O | NE | NE 15 O |
| LISS (Zo) | NE | NE | NE | 15.0 | NE | 15.0 |
| Zinc (Zn) | NE | 1.0 | NE | 1.0 | NE | 1.0 |

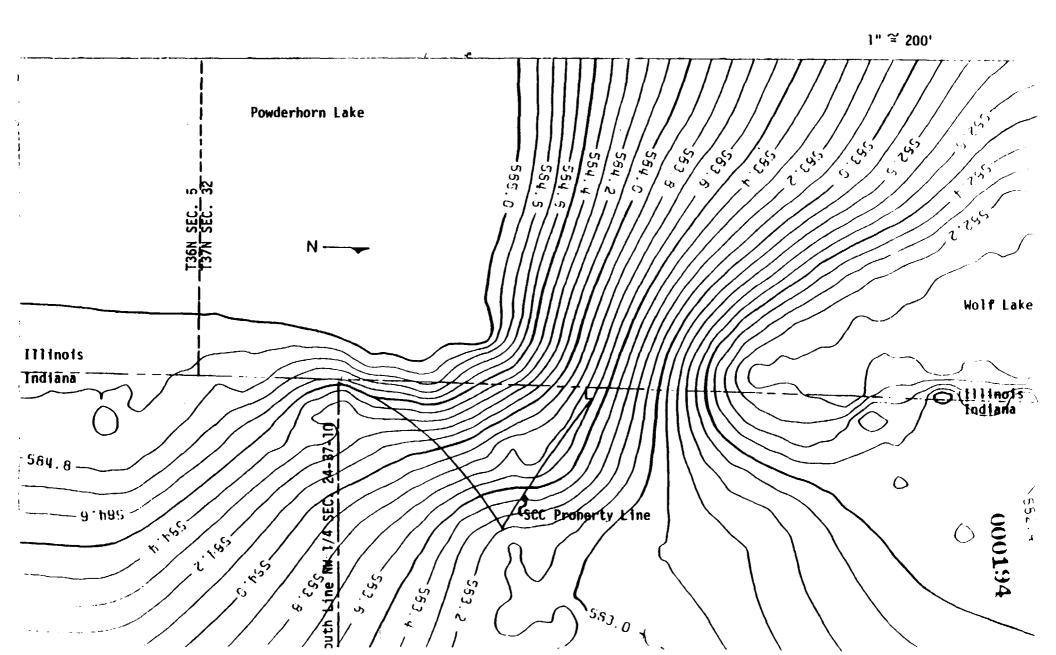
YE= Not Established

- Illinois Pollution Control Board Part II: Surface Water Quality Standards
 Illinois Pollution Control Board Part II: Water Quality Standards
 Illinois Pollution Control Board Part IV: Effluent Standards

GROUNDWATER ELEVATIONS -- CALUMET CONTAINER

STS Job No. 20919

NATURAL GROUND WATER FLOW PATTERN



GROUNDUNTER THE VOLLON PHASE TA

COLUMET CONTINUES

STS Job No. 20919

SURFACE MOUNDING CONDITION FLOW PATTERNS

1" ~ 200' Powderhorn Lake **Holf** Lake Illinois Indiana / Illinois. Indiana SCC Property Line

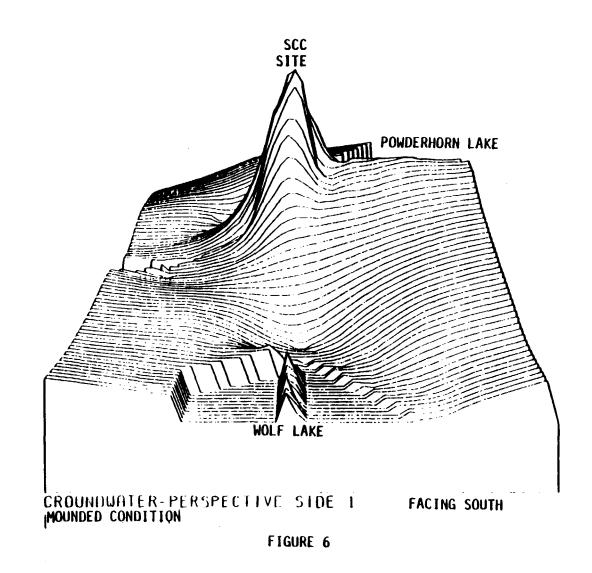


FIGURE 7

U.S. EPA ADMINISTRATIVE RECORD REMOVAL ACTION ORIGINAL CALUMET CONTAINER CORPORATION HAMMOND, INDIANA NOVEMBER 1990